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A

TREATISE

ON THE

OPERATIONS OF SURGERY.

WITH A

DESCRIPTION AND REPRESENTATION

OF THE

INSTRUMENTS USED IN PERFORMING THEM.

TO WHICH IS PREFIXED, AN

INTRODUCTION,

ON THE

NATURE AND TREATMENT

OF

WOUNDS, ABSCESSES, AND ULCERS.

By SAMUEL SHARPE,

FELLOW OF THE ROYAL SOCIETY, AND MEMBER OF THE ACADEMY OF SURGERY AT PARIS.

A NEW EDITION.

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MDCCLXXXVIII.

UNIVERSITY
OF BRISTOL
MEDICINE

TO

WILLIAM CHESELDEN, Esq.

SURGEON TO CHELSEA HOSPITAL.

SIR,

AS I am chiefly indebted to the Advantage of an Education under You for whatever Knowledge I can pretend to in Surgery, I could not in the leaſt heſitate to whom I ſhould dedicate this Treatiſe; though, was it my Misfortune to be a Stranger to your Perſon, that Merit which has made the World ſo long eſteem You the Ornament of our Profeſſion, would alone have induced me to ſhew You this Mark of my Reſpect, which, I hope, will not be unacceptable from,

SIR,

Your moſt obedient

Humble Servant,

S. SHARPE.

PREFACE.

AS the methods of operating in Surgery have of late years been exceedingly improved in England, and as there is no treatiſe of character on that ſubject written in our language, I believe it is not neceſſary to apologize for this undertaking: it is true, we have a few tranſlations from the writings of foreigners; but, beſides that they are unacquainted with theſe improvements, their manner of deſcribing an operation is ſo very minute, and in general ſo little pleaſing, that, could nothing new be added, or nothing falſe exploded, the poſſibility of only doing it more conciſely and agreeably, would be a reaſonable inducement to the attempt.

In the deſcription of diſeaſes, I have only mentioned their diſtinguiſhing appearances, and have not once dared to gueſs at that particular diſorder in the animal œconomy, which is the immediate cauſe of them: indeed, the uncertainty there is in conjectures of this intricate nature, and the little ſervice that can accrue to ſurgery from ſuch ſpeculative enquiries, have entirely deterred me from all pretence to this ſort of theory; and ſince the moſt ingenious men hitherto have not, by the help of hypotheſis, done any conſiderable ſervice to the practice of ſurgery, nay, for the moſt part, have miſled young ſurgeons from the ſtudy of the ſymptoms and cure of diſeaſes to an idle turn of reaſoning, and a certain ſkill in converſation, which has very much diſcredited the art amongſt men of ſenſe, I hope I am right in my ſilence on that head.

It has been very much my endeavour to make this treatiſe ſhort, and therefore I have given no hiſtories of caſes, but where the uncommonneſs of the doctrine made it proper to illuſtrate it with fact, and theſe I have recited in the moſt conciſe manner I was able: on this account too, I think I have not attempted to explode any practice which is already in diſrepute, and if it appear otherwiſe to men of ſkill here in London, I beg they will refer to thoſe books of ſurgery

which are now the beſt eſteemed in Europe, and to whic
have almoſt always had an eye in the criticiſms I have m
on the generality of opinions.

It is uſual with moſt writers to deſcribe at length the ſe
ral bandages proper to be employed after each operation ;
as the manner of applying them can hardly be learned fro
deſcription only, or if it could, there is ſo little to be ſaid
that ſubject, but what muſt be copied from others, tha
have forboren to follow the example ; though, to ſay
truth, the purpoſe of bandage being chiefly to maintain a c
ſituation of a dreſſing, or to make a compreſs on differ
parts, ſurgeons always turn a roller with thoſe views, as th
diſcretion and dexterity guide them, without any regard to
exact rules laid down in theſe deſcriptions, which are alm
impoſſible to be retained in the memory without a contin
practice of them, and therefore we ſee are not much atten
ed to.

In the firſt edition of this treatiſe I aſſerted, that the hæmo
rhage, which ſometimes enſues in the lateral operation, h
been eſteemed an objection of ſo great weight, as to have o
caſioned its being ſuppreſſed in the hoſpitals of France by
royal edict : I have ſince been informed I was miſtaken
that particular, and that it had only been forbidden in t
Charité, by Monſieur Marechal, the king's firſt ſurgeo
who had the inſpection of the practice of ſurgery in th
hoſpital : what were his motives for not ſuffering this metho
to be continued there, after having been perfermed a who
ſeaſon, I will not take upon me to determine.

INTRODUCTION.

CHAP. I.

OF WOUNDS.

TO conceive rightly of the nature and treatment of wounds, under the variety of diſorders that they are ſubject to, it will be proper, firſt, to learn what are the appearances in the progreſs of healing a large wound, when it is made with a ſharp inſtrument, and the conſtitution is pure.

In this circumſtance, the blood-veſſels, immediately upon their diviſion, bleed freely, and continue bleeding, till they are either ſtopped by art, or at length contracting and withdrawing themſelves into the wound, their extremities are ſhut up by the coagulated blood. The hæmorrhage being ſtopped, the next occurrence, in about twenty-four hours, is a thin ſerous diſcharge; and a day or two after, an increaſe of it, though ſomewhat thickened, and ſtinking. In this ſtate it continues two or three days without any great alteration; from which time the matter grows thicker and leſs offenſive; and, when the bottom of the wound fills up with little granulations of fleſh, it diminiſhes in its quantity, and continues doing ſo till the wound is quite ſkinned over.

The firſt ſtage of healing, or the diſcharge of matter, is by ſurgeons called *Digeſtion*; the ſecond, or the filling-up with fleſh, *Incarnation*; and the laſt, or ſkinning-over, *Cicatrization*. Theſe are the technical terms chiefly in uſe, and are fully ſufficient to deſcribe the ſtate of wounds, without the farther ſubdiviſions uſually found in books.

It is worth obſerving, that the loſs of any particular part of the body can only be repaired by the fluids of that diſtinct part. As, in a broken bone, the callus is generated from the ends of the fracture, ſo, in a wound, is the cicatrix from the circumference of the ſkin only. Hence ariſes the neceſſity of keeping the ſurface even, either by preſſure, or eating medicines, that the eminence of the fleſh may not reſiſt the fibres of the ſkin in their tendency to cover the wound. This eminence is compoſed of little points, or granulations, called *Fungus*, or proud fleſh, and is frequently eſteemed an evil, though, in truth, this ſpecies of it be the conſtant attendant on healing wounds; for, when they are ſmooth, and have no diſpoſition to ſhoot out above their lips, there is a ſlackneſs to heal, and a cure is very difficultly effected. Since then a fungus prevents healing only by its luxuriancy, and all wounds cicatrize from their circumference, there will be no occaſion

to

to deſtroy the whole fungus every time it riſes, but only the edges of it near the lips of the ſkin, which may be done by gentle eſcharotics, ſuch as lint dipped in a mild ſolution of vitriol, or for the moſt part only by dry lint, and a tight bandage, which will reduce it ſufficiently to a level, if applied before the fungus have acquired too much growth. In large wounds, the application of corroſive medicines to the whole ſurface, is of no uſe; becauſe the fungus will attain but to a certain height when left to itſelf, which it will be frequently riſing up to, though it be often waſted; and as all the advantage to be gathered from it, is only from the evenneſs of its margin, the purpoſe will be as fully anſwered by keeping that under only, and an infinite deal of pain avoided from the continual repetition of eſcharotics.

When I ſpeak of the neceſſity of a wound being repaired by the ſame fluids of which the part was before compoſed, I mean, upon the ſuppoſition, that the renewal be of the ſame ſubſtance with the part injured; as callus is of bone, and a cicatrix is of ſkin; for a vacuity is generally filled up with one ſpecies only of fleſh, though it poſſeſs the ſpace in which were included, before the wound was made, the diſtinct ſeparate ſubſtances of membrana adipoſa, membrana muſculorum, and the muſcle itſelf; and even if we ſcratch or perforate a bone, there are certain wounded veſſels in it that puſh out fleſh which becomes the covering of it; and after fractures of the ſkull, when the ſurface of the brain is hurt, and part of the membranes and bones removed, the whole cavity is filled up by nearly the ſame uniform ſubſtance, till it arrive even with the ſkin, which ſpreads over it to complete the cure.

On this account it is, that after the healing of wounds, where the ſurface of the bone has been bare, the cicatrix is always adherent to it, and no abſolute diſtinction of parts preſerved; though if a wound be made of any certain magnitude, the adherence, after healing, will not be ſo wide as the wound itſelf was, but only of the extent of the cicatrix, which is always much ſmaller than the inciſion; becauſe healing does not conſiſt only in the forming of new matter, but alſo in the elongation of the fibres of the circumjacent ſkin and fleſh towards the center of the wound; which will cover it in more or leſs time, and in greater or leſs quantity, in proportion to their laxneſs; for the fear does not begin to form till they reſiſt any farther extenſion; hence ariſes the advantage, in amputations, of having a great deal of ſkin.

From what has been ſaid of the progreſs of a wound made by a ſharp inſtrument, where there is no indiſpoſition of body, we ſee the cure is performed without any interruption but from the fungus; ſo that the buſineſs of ſurgery will conſiſt principally in a proper regard to that point, and in applications that will the leaſt interfere with the ordinary courſe of nature, which, in theſe caſes, will be ſuch as act the leaſt upon the ſurface of the wound; and agreeably to this we find, that dry lint only is generally the beſt remedy through the whole courſe of dreſſing; at firſt it ſtops the blood with leſs injury than any ſtyptic powders or waters, and afterwards, by abſorbing the matter which in the beginning of ſuppuration is thin and acrimonious, it becomes in effect a digeſtive: during incarnation it is the ſofteſt medium that can be applied between the roller and tender granulations, and at the ſame time is an eaſy compreſs upon the ſprouting fungus.

Over the dry lint may be applied a pledget of ſome ſoft ointment ſpread upon tow, which muſt be renewed every day, and preſerved in its ſituation by a gentle bandage; though in all large wounds, the firſt dreſſing after that of the accident or operation, ſhould not be applied in leſs than three days, when the matter being formed, the lint ſeparates more eaſily

ſily from the part; in the removal which, no force ſhould be uſed, it only ſo much be taken away as is oſe, and comes off without pain.

Perhaps it may appear ſurpriſing, iat I do not recommend either di-ſtive or incarnative ointments, hich have had ſuch reputation for-erly for their efficacy in all ſpecies wounds; but as the intent of me-cines is to reduce the wound to a tural ſtate, or a propenſity to heal, hich is what I have already ſup-ſed it to be in) the end of ſuch ap-ications is not wanted; and in other ſpects dry lint is more advantage-s, as may be learned from what I ve ſaid of its benefits. There are rtainly many caſes in which differ-t applications will have their ſeveral es; but theſe are when wounds are ended with a variety of circum-nces not ſuppoſed in that I have en ſpeaking of; though even when eſe, by the virtue of medicines, are luced to as kind a ſtate, the method treating them afterwards ſhould be ſame, as will be better underſtood the next chapter, in which I ſhall at more particularly by the dreſſ-; of wounds.

CHAP. II.

F INFLAMMATIONS AND ABSCESSES.

AS almoſt all abſceſſes are the con-uences of inflammations, and theſe oduce a variety of events as they differently complicated with other orders, it will be proper firſt to ke ſome enquiry into their diſpo-on. Inflammations from all cauſes ve three ways of terminating; ei-r by diſperſion, ſuppuration, or ngrene; a ſchirrhous gland is al-ys mentioned as a fourth, but, I nk, with impropriety, ſince it ſel-n or never occurs but in venereal, ophulous, or cancerous caſes, when s the fore-runner, and not the con-uence, of an inflammation, the tumour generally appearing ſome time before the diſcolouration.

But though every kind of inflam-mation will ſometimes terminate in different ſhapes, yet a probable con-jecture of the event may be always gathered from the ſtate of the pa-tient's health. Thus, inflammations happening in a ſlight degree upon colds, and without any foregoing in-diſpoſition, will moſt probably be diſperſed; thoſe which follow cloſe upon a fever, or happen to a very groſs habit of body, will generally impoſthumate; and thoſe which fall upon very old people, or dropſical conſtitutions, will have a ſtrong ten-dency to gangrene.

If the ſtate of an inflammation be ſuch as to make the diſperſion of it ſafely practicable, that end will be beſt brought about by evacuations, ſuch as plentiful bleeding and repeat-ed purges. The part itſelf muſt be treated with fomentations twice a day; and if the ſkin be very tenſe, it may be embrocated with a mixture of three-fourths of oil of roſes, and one-fourth of common vinegar, and af-terwards be covered with *unguent. flor. ſamb.* or a ſoft ointment made of white wax and ſweet oil, ſpread upon a fine rag, and rolled on gently. I know that almoſt all ſurgeons are averſe to the application of any thing unctuous to an inflamed ſkin, upon the ſuppoſition of its obſtructing the pores, and by that means preventing the tranſpiration of the obſtructed fluids, which is imagined to be one of the ways that an inflammation is removed. But whether this reaſoning be founded on practice, or theory on-ly, I am not clear; though I think it very certain, that inflammations, left to themſelves, often grow ſtiff and painful, and are to be eaſed by any medicine that makes them more ſoft and pliable; which ſhould not incline us to believe, that relaxing medicines interrupted the diſpoſition to a cure. However, to preſerve ſome ſort of medium, in inflammations of the face (where they are eſteemed moſt

dangerous,

dangerous) it may be made a rule to use nothing more oily than warm milk, with which the face may be embrocated five or six times a day. If after four or five days, the inflammation begins to subside, the purging waters and manna may take place of other purges, and the embrocation of oil and vinegar be now omitted, or sooner, if it has begun to excoriate. The ointment of wax and oil may be continued to the last: or if, upon conclusion of the cure, the itching of the skin should be troublesome, it may better be relieved by the application of nutritum, which is an ointment made of equal parts of diachylon and sweet oil, melted softly down, and afterwards stirred together with a little addition of vinegar till they are cold. During the cure, a thin diet is absolutely necessary, and, in the height of the inflammation, the drinking of thin liquors is of great service.

Here I have supposed that the inflammation had so great a tendency to discussion, as by the help of proper assistance to termin te in that manner; but when it happens that the disposition of the tumour resists all discutient means, we must then desist from any farther evacuations, and, as much as we can, assist nature in the bringing on a suppuration.

That matter will most likely be formed, we may judge from the increase of the symptomatic fever, and enlargement of the tumour, with more pain and pulsation; and if a small rigour come on, it is hardly to be doubted. Inflammations after a fever, and the small-pox, almost always suppurate; but these presently discover their tendency, or at least should be at first gently treated, as though we expected an imposthumation. It is a maxim laid down in surgery, that evacuations are pernicious in every circumstance of a disease, which is at last to end in suppuration: but as physicians do now acknowledge, that bleeding on certain occasions in the small-pox, is not only no impediment to the ma ration, but even promotes it; so, the formation of abscesses, when vessels have been clogged, and suppuration has not kindly advance bleeding has sometimes quickened exceedingly; but, however, this pra tice is to be followed with cautio Purges are, no doubt, improper this time; yet if the patient be costiv he must be assisted with gentle clyst every two or three days.

Of all the applications invented promote suppuration, there are no so easy as poultices; but as there a particular tumours very slow of su puration, and almost void of pa (such, for instance, are some of th scrophulous swellings) it will be le troublesome in these cases to wea the gum-plasters, which may be re newed every four or five days only Amongst the suppurative poultice perhaps there is none preferable t that made of bread and milk softene with oil; at least, the advantage o any other over it, is not to be distin guished in practice. The use of sup purative plasters in hasty abscesses or inflammations in a weak or drop sical habit of body, is by no mean advisable, as they are apt to sit un easy on the inflammation, are ofte painful to remove when we enquir into the state of the tumour, and by their compress in bad constitutions add something to the disposition o the part to mortify. The abscess may be covered with the poultice twice a day, till it be come to that ripeness as to require opening, which will be known by the thinness and eminence of the skin in some part of it, a fluctuation of the matter, and, generally speaking, an abatement of the pain previous to these appearances. The manner of opening an abscess I shall describe after having spoken of a gangrene, which is the other consequence of an inflammation.

The signs of a gangrene are these: the inflammation loses its redness, and becomes duskish and livid; the tenseness of the skin goes off, and feels so

the

uch, flabby or emphyſematous; tions filled with ichor of diſ- colours ſpread all over it; the ur ſubſides, and from a duſkiſh lexion, turns black; the pulſe ens and ſinks, and proſuſe s coming on, at laſt grow cold, he patient dies.

ſtop the progreſs of a mortifi- n, the method of treatment will early the ſame, from whatever it may proceed, except in that g from cold; in which caſe we to be cautious not to apply th too ſuddenly to the part, if true, that in the northern ries they have daily conviction ngrenes produced by this means, might have been eaſily prevent- avoiding heat; nay, they carry apprehenſion of the danger of n warmth ſo far, as to cover the with ſnow firſt, which, they ſay, n fails to obviate any ill conſe- ce.

e practice of ſcarifying gan- by ſeveral inciſions is almoſt rſal, and I think with reaſon, iit not only ſets the parts free, iſcharges pernicious ichor, but way for whatever efficacy there e in topical applications. Theſe fferent with different ſurgeons; believe the digeſtives, ſoftened oil of turpentine, are as good igs as any for the ſcarifications; upon them, all over the part, e laid the *theriaca Londinenſis*, ſhould be always uſed in the ning of a gangrene, before the ity of ſcarifying ariſes; or is equally good, if not often able, a cataplaſm made with um and bran, and applied , which will retain its heat bet- an moſt other topicals. There me who inſiſt upon having had cular ſucceſs in the ſtopping of encs from the uſe of the ds of ſtrong beer, mixed with or oatmeal; but there are any facts leſs proper to infer than the ceaſing of a mortifi- n, ſince we ſee, amongſt the poor that are brought into the hoſpitals, how often it happens without any aſſiſtance; however, it is certain that ſervice may be done by ſpirituous fomentations, and the dreſſings above mentioned, which are to be repeated twice a day; medicines alſo given internally are beneficial, and theſe ſhould conſiſt of the cordial kind, though at preſent the bark is ordered by a great many ſurgeons as the ſovereign remedy for this diſorder. After the ſeparation of the eſchar, the wound becomes a common ulcer, and muſt be treated as ſuch.

There are two ways of opening an abſceſs; either by inciſion or cauſtick; but inciſion is preferable in moſt caſes. In ſmall abſceſſes, there is ſeldom a neceſſity for greater dilatation than a little orifice made with the point of a lancet; and in large ones, where there is not a great quantity of ſkin diſcoloured and become thin, an inciſion to their utmoſt extent will uſually anſwer the purpoſe; or, if there be much thin diſcoloured ſkin, a circular or oval piece of it muſt be cut away; which operation, if done dexterouſly with a knife, is much leſs painful than by cauſtic, and at once lays open a great ſpace of the abſceſs, which may be dreſſed down to the bottom, and the matter of it be freely diſcharged; whereas, after a cauſtic, though we make inciſions through the eſchar, as is the uſual practice, yet the matter will be under ſome confinement, and we cannot have the advantage of dreſſing properly, till the ſeparation of the ſlough, which often requires a conſiderable time, ſo that the cure muſt be neceſſarily delayed beſides, that the pain of burning continuing two or three hours, which a cauſtic uſually requires in doing its office, draws ſuch a fluxion upon the ſkin round the eſchar, as ſometimes to indiſpoſe it very much for healing afterwards. In the uſe of cauſtics, it is but too much a practice to lay a ſmall one on the moſt prominent part of a large tumour,

which not giving sufficient vent to the matter, and perhaps the orifice soon after growing narrow, leads on to the necessity of employing tents; which two circumstances, more frequently make fistulas after an abscess, than any malignity in the nature of the abscess itself. The event would more certainly be the same after a small incision; but I observe, that surgeons not depending so much on small openings by incision, as by caustic, do, when they use the knife, generally dilate sufficiently; whereas, in the other way, a little opening in the most depending part of the tumour, usually satisfies them: but as the method of making small orifices for great discharges, is for the most part tedious of cure, very often requiring dilatation at last, and now and then pernicious in the consequence above mentioned, and even making the adjacent bones carious, I thought it might not be useless to caution against this practice.

Here it may not be amiss to observe, that notwithstanding the depending part of an abscess is esteemed the most eligible for an opening, yet it is always on the supposition that the teguments are as thin in that place as any other part of it; otherwise it will be generally adviseable to make the incision where nature indicates, that is, where the tumour is inflamed and prominent, though it should not be in a depending part.

The indiscriminate application of caustics to all abscesses, often runs into the same mischief of tediousness in the cure, from a cause exactly the reverse of that I have been describing; for as in great swellings they are seldom laid on large enough, and the matter continues draining for want of a sufficient opening; so, in small ones, they make a greater opening than is necessary, and therefore demand a greater length of time to repair the wound. I confess the disposition of abscesses to fill up, after the discharge of matter, is so very different, that some few large one well after the mere puncture lancet, if the orifice be made in a pending part, and a proper ban can be applied; though if ever trust to such an opening, it shoul in abscesses about the face, where should be more careful to avoid deformity of a scar, than in any o part, and where also the method be more likely to succeed, from t situation; it being a maxim in gery, that abscesses and ulcers have a greater or less tendency to h as they are higher or lower in body; however, even in absce of the face, if the skin be very th it will be always safer to open length of it, than trust to a punct only.

From this account of the meth of opening abscesses, it does not a pear often necessary to apply caustic yet they have their advantages in so respects, and are seldom so terri to patients as the knife, though fact they are frequently more pain to bear; they are of most use in ca where the skin is thin and inflame and we have reason to think the m lignity of the abscess is of that n ture as to prevent a quickness of i carning, in which circumstance, if a incision only were made through th skin, little sinuses would often form and burrow underneath, and the lig of it lying loose and flabby, woul become callous, and retard the cur though the malignity of the woun were corrected: of this kind are ve nereal buboes, which notwithstandin they often do well by mere incision yet when the skin is in the state I ha supposed, the caustic is always pre ferable, as I have had many opportu nities of being convinced. It is t be observed, I confine this method t venereal buboes; for those which fol low a fever, or the small-pox, for the most part are curable by incision only. There are many scrophulou tumours, where the reasoning is the same as in the venereal; and eve

eat ſwellings where I have re-nended inciſion, if the patient not ſubmit to cutting, and the eon is apprehenſive of any danger ounding a large veſſel, which is a done with the knife (though it readily be taken up with the le and ligature) yet as this in-venience is avoided by cauſtic, it on ſuch an occaſion be made uſe but I think after the eſchar is e, it ſhould be cut almoſt all away, ch will be no pain to the patient, will give a much freer diſcharge he matter than inciſions made ugh it: however, in ſcrophulous lings of the neck and face, unleſs are very large, cauſties are not ſeable, ſince in that part of the y, with length of time, they heal r inciſion. Cauſties are of great ice in deſtroying ſtubborn ſcro-ous indurations of the glands, venereal indurations of the ds of the groin, which will neither uſs nor ſuppurate; likewiſe in ex-ng carious bones, and making e iſſues. The beſt cauſtic in uſe, paſte made with lime and *lixi-n capitale*, which is to be pre-ted from ſpreading by cutting an ee in a piece of ſticking plaſter, ly as big as you mean to make the ar, which being applied to the ; the cauſtic muſt be laid on the ice, and preſerved in its ſituation a few ſlips of plaſter laid round its es, and a large piece over the le. When iſſues are made, or es expoſed, the eſchar ſhould be out immediately, or the next day; if we wait the ſeparation, we miſ-y in our deſign of making a deep ning; ſince ſloughs are flung off the ſprouting new fleſh under-th, which fills up the cavity at the e time that it diſcharges the ar; ſo that we are obliged after-ds to make the opening a ſecond e with painful eſcharotic medi-es. To make an iſſue, or lay a e bare, this cauſtic may lie on ut four hours; to deſtroy a large gland, five or ſix; and to open an abſceſſes, an hour and a half, two hours, or three hours, according to the thickneſs of the ſkin; and what is very remarkable, notwithſtanding its ſtrength and ſudden efficacy, it frequently gives no pain where the ſkin is not inflamed, as in making iſſues, and opening ſome few abſceſſes.

Hitherto I have ſuppoſed the ſurgeon has had the opportunity of opening the tumour at the moſt eligible time, that is, when the ſkin is thin, and the fluctuation of the matter very ſenſible; which is always to be waited for, notwithſtanding it be very much taught, to open critical abſceſſes before they come to an exact ſuppuration, in order to give vent ſooner to the noxious matter of the diſeaſe; but in opening before this period, practitioners miſs the very deſign they aim at, ſince but little matter is depoſited in the abſceſs before it arrives towards its ripeneſs, and beſides, the ulcer afterwards grows foul, and is leſs diſpoſed to heal.

When an abſceſs is already burſt, we are to be guided by the probe where to dilate, obſerving the ſame rules with regard to the degree of dilatation, as in the other caſe; the uſual method of dilating is with the probe-ſciſſars; and, indeed, in all abſceſſes the generality of ſurgeons uſe the ſciſſars, after having firſt made a puncture with a lancet; but as the knife operates much more quickly, and with leſs violence to the parts, than ſciſſars, which ſqueeze at the ſame time that they wound, it will be ſparing the patient a great deal of pain to uſe the knife, wherever it is practicable, which is in almoſt all caſes, except ſome fiſtulas in *ano*, where the ſciſſars are more convenient. The manner of opening with a knife, is by ſliding it on a director, the groove of which prevents its being miſguided. If the orifice of the abſceſs be ſo ſmall as not to admit the director, or the blade of the ſciſſars, it muſt be en-

larged by a piece of ſponge tent, which is made by dipping a dry bit of ſponge in melted wax, and immediately ſqueezing as much out of it again as poſſible, between two pieces of tile or marble; the effect of which is, that the looſe ſponge being compreſſed into a ſmall compaſs, if any of it be introduced into an abſceſs, the heat of the part melts down the remaining wax that holds it together, and the ſponge ſucking up the moiſture of the abſceſs, expands, and in expanding, opens the orifice wider, and by degrees, ſo as to give very little pain.

The uſual method of dreſſing an abſceſs, the firſt time, is with dry lint only, or if there be no flux of blood, with ſoft digeſtives ſpread on lint. If there be no danger of the upper part of the wound re-uniting too ſoon, the doſſils muſt be laid in looſe; but if the abſceſs be deep, and the wound narrow, as is the caſe ſometimes of abſceſſes in *ano*, the lint muſt be crammed in pretty tightly, that we may have afterwards the advantage of dreſſing down to the bottom without the uſe of tents, which are almoſt univerſally decried in theſe days, though they ſtill continue to be employed too much by the very people who would ſeem to explode them moſt; ſo difficult is it to be convinced of the true efficacy of nature in the healing of wounds. Formerly the virtues of tents have been much inſiſted on, as it was then thought abſolutely neceſſary to keep wounds open a conſiderable time, to give vent to the imaginary poiſon of the conſtitution; it was ſuppoſed too, that they were beneficial in conveying the proper ſuppurative or ſarcotic medicines down to the bottom of the abſceſs; and again, that by abſorbing the matter, they preſerved the cleanlineſs of the wound, and diſpoſed it to heal. But this reaſoning is not now eſteemed of any force; ſurgeons at preſent know that a wound cannot heal too faſt, provided that it heal firmly from the bottom; they are very well ſatisfied alſo, from what they ſee in wounds, where no medicines are applied, that nature herſelf ſhoots forth new fleſh, and is interrupted by any preſſure whatſoever; beſides, as to the conceit of tents ſucking up the matter which is eſteemed noxious to healing, they are ſo far from being beneficial in the performance of it, that they are of great prejudice; for if the matter be offenſive in its nature, though they do abſorb it, they bring it into contact with every part of the ſinus; and if it be prejudicial by its quantity, they do miſchief in locking it up in the abſceſs, and preventing the diſcharge it would find, if the dreſſings were only ſuperficial; but in fact, matter, when it is good, is of no diſſervice to wounds with regard to its quality; and ſurgeons ſhould therefore be leſs curious in wiping them clean, when they are tender and painful. That tents are impediments to healing rather than aſſiſtants, we may learn from conſidering the effect of a pea in an iſſue, which by preſſure keeps open the wound juſt as tents do; and if there are inſtances of wounds healing very well notwithſtanding the uſe of tents, ſo there are alſo of iſſues healing up, in ſpite of any meaſures we can take to keep a pea in its cavity. In ſhort, tents in wounds, by reſiſting the growth of the little granulations of fleſh, in proceſs of time harden them, and in that manner produce a fiſtula; ſo that inſtead of being uſed for the cure of an abſceſs, they never ſhould be employed but where we mean to retard the healing of the external wound, except in ſome little narrow abſceſſes, where if they be not crammed in too large, they become as doſſils, admitting of incarnation at the bottom; but care ſhould be taken, not to inſinuate them much deeper than the ſkin in this caſe, and that they ſhould be repeated twice a day, to give vent to the matter they confine. Sometimes they are of ſervice in large abſceſſes, particularly of the breaſt, where

where the matter cannot discharge itself by the orifice already made, and yet does not point sufficiently to any other part for an opening, though it make signs whither it would tend, if it were a little confined. In such an instance, a tent plugging up the orifice, would make the matter recur to the part disposed to receive it, and mark the place for a counter-opening: but tents do most good in little deep abscesses, whence any extraneous body is to be evacuated, such as small splinters of bone, &c.

The use of vulnerary injections into abscesses has been thought to bear so near a resemblance to the use of tents, that they both fell into disrepute almost at the same time. It has been said in their favour, that in deep abscesses, where no ointment can be applied, they digest, cleanse, and correct the malignity of the pus; but the fact is, that they do so much mischief by frequently distending the parts of the abscess, first, when they are injected, and afterwards, by their addition to the matter generated in the abscess, that they are hardly proper in any case: though one of the great mischiefs of injections and tents both, has been a mistaken faith amongst practitioners, that wherever their medicines were applied, the part would heal; and upon that presumption, they have neglected to dilate abscesses, which have not only remained incurable after this treatment, but would often have done so for want of a discharge, if they had been dressed more superficially.

In dressing wounds, it is common to apply the medicines warm, or hot, upon the supposition that heated ointments have a stronger power of digesting than cold; but as any medicine will soon arrive to the heat of the part it is laid on, whether it be applied hot or cold, the efficacy of the heat can avail but little in so small a time; and as dossils dipped in hot ointments are not cleanly, and even grow stiff and painful, besides that the patient is liable to be burnt by laying on too hot, I think it rather preferable to apply them cold, or perhaps in winter a little warmed before the fire after they are spread; observing, if the ulcer be uneven, to make the dossils small, in order to lie close. Over the dossils of lint may be laid a large pledgit of tow, spread with basilicon, which will lie softer than a defensative plaster; for this, though designed to defend the circumference of wounds against inflammation, or a fluxion of humours, is often the very cause of them; so that the dressings of large wounds should never be kept on by these plasters, where there is danger of such accidents; and it is on the account of the unfitness of plasters of any kind for an inflammation, that I have omitted to mention any of them as proper discutients in that disorder. In this manner the dressings may be continued till the cavity is incarned, and then it may be cicatrized with dry lint, or some of the cicatrizing ointments, observing to keep the fungus down, as directed before: if the drying ointment be the cerat. de lapid. calam. the stone must be thoroughly levigated before it be put into it, otherwise the ointment will be corrosive.

In the course of dressing, it will be proper to have regard to the situation of the abscess, and as much as possible to make the patient favour the discharge by his ordinary posture: and to this end also, as what is of greater importance than the virtue of any ointment, the discharge must be assisted by compress and bandage, the compress may be made of rags or plaster; though the latter is sometimes preferable, as it remains immoveable on the part it is applied to. The frequency of dressing will depend on the quantity of discharge; once in twenty-four hours is ordinarily sufficient; but sometimes twice, or perhaps three times, is necessary. I have before mentioned, not to be too scrupulously

pulouſly nice in cleaning a wound; but it is worth remarking, that a ſore ſhould never be wiped by drawing a piece of tow or rag over it, but only by dabbing it with fine lint, which is a much eaſier method for the patient: the parts about it may be wiped clean in a rougher manner, without any prejudice. I do not think the air has that ill effect on ſores as is generally conceived; nor would the large abſceſſes on beaſts, which are often expoſed to the air the whole time of cure, do well, if it were ſo very pernicious as is repreſented; but as it tends to the making a ſcab, and in winter is a little painful to the new fleſh, it will be right to finiſh the dreſſing as quick as may be, without hurrying. Another caution neceſſary in the treatment of abſceſſes, is, that ſurgeons ſhould not upon all occaſions ſearch into their cavities with the finger or probe, as it often tears them open, and indiſpoſes them for a cure.

CHAP. III.

OF ULCERS.

WHEN a wound or abſceſs degenerates into ſo bad a ſtate as to reſiſt the uſual methods of cure I have hitherto laid down, and loſes that complexion which belongs to a healing wound, it is called an *Ulcer*; and as the name is generally borrowed from the ill habit of the ſore, it is a cuſtom to apply it to all ſores that have any degree of malignity, though they be immediately formed without any previous abſceſs or wound; ſuch are the venereal ulcers of the tonſils, &c. &c.

Ulcers are diſtinguiſhed by their particular diſorders, though it ſeldom happens that the affections are not complicated; and when we lay down rules for the management of one ſpecies of ulcer, it is generally requiſite to apply them to almoſt all others. However, the characters moſt eminence are, the callous ulc the ſinuous ulcer, and the ulcer w caries of the adjacent bone: thou there be abundance more known ſurgeons, ſuch as the putrid, the co roſive, the varicous, &c. but as th have all acquired their names fro ſome particular affection, I ſhall ſpea of the treatment of them under t general head of ulcers.

It will be often in vain to purſu the beſt means of cure by topical a plication, unleſs we are aſſiſted by i ternal remedies; for as many ulce are the effects of a particular indiſpo ſition of body, it will be difficult t bring them into order, while the cau of them remains with any violence though they are ſometimes in a grea degree the diſcharge of the indiſpo ſition itſelf, as in the plague, ſmall pox, &c. But we ſee it generally ne ceſſary in the pox, the ſcurvy, ob ſtructions of the menſes, dropſies, and many other diſtempers, to give in ternals of great efficacy; and indeed there are hardly any conſtitutions where ulcers are not aſſiſted by ſome phyſicial regimen. Thoſe that are cancerous and ſcrophulous, ſeem to gain the leaſt advantage from phyſic; for if in their beginnings they have ſometimes been very much relieved, or cured by ſalivation, or any other evacuation, they are alſo often irritated, and made worſe by them; ſo that there is nothing very certain in the effects of violent medicines in theſe diſtempers. I have ſeen alſo great quantities of alteratives tried on a variety of ſubjects, but I cannot ſay with extraordinary ſucceſs: upon the whole, I think in both theſe caſes the milk-diet, and gentle purging with manna, and the waters, ſeem to be moſt efficacious; though briſk methods may be uſed with more ſafety in the evil than the cancer; and ſometimes, particularly in young ſubjects, the decoction of the woods is extremely beneficial for ſcrophulous ulcers: but it has lately been atteſted by men

of

of great ſkill and veracity, that ſea-water is more powerful than any other remedy hitherto known, both for ſcrophulous ulcers, and ſcrophulous tumours.

When an ulcer becomes foul, and diſcharges a naſty thin ichor, the edges of it, in proceſs of time, tuck in, and growing ſkinned and hard, give it the name of a callous ulcer, which, ſo long as the edges continue in that ſtate, muſt neceſſarily be prevented from healing: but we are not immediately to deſtroy the lips of it, in expectation of a ſudden cure; for while the malignity of the ulcer remains, which was the occaſion of the callofity, ſo long will the new lips be ſubject to a relapſe of the ſame kind, however often the external ſurface of them be deſtroyed; ſo that when we have to deal with this circumſtance, we are to endeavour to bring the body of the ulcer into a diſpoſition to recover by other methods. It ſometimes happens to poor laborious people, who have not been able to afford themſelves reſt, that lying a-bed will in a ſhort time give a diverſion to the humours of the part, and the callous edges ſoftening, will, without any great aſſiſtance, ſhoot out a cicatrix, when the ulcer is grown clean and filled with good fleſh: The effect of a ſalivation is generally the ſame; and even an iſſue does ſometimes diſpoſe a neighbouring ulcer to heal: but though callofities be frequently ſoftened by theſe means, yet when the ſurface of the ulcer begins to yield thick matter, and little granulations of red fleſh ſhoot up, it will be proper to quicken nature by deſtroying the edges of it, if they remain hard. The manner of doing this is by touching them a few days with the lunar cauſtic, or lapis infernalis, and ſome chooſe to cut them off with a knife; but this laſt method is very painful, and not, as I can perceive, more efficacious; though when the lips do not tuck down cloſe to the ulcer, but hang looſe over it, as in ſome venereal buboes, where the matter lies a great way under the edges of the ſkin, the eaſieſt method is cutting them off with the ſciſſars.

To digeſt the ulcer, or to procure good matter from it when in a putrid ſtate, there are an infinity of ointments invented; but the baſilicon flavum alone, or ſoftened down ſometimes with turpentine, and ſometimes mixed up with different proportions of red precipitate, ſeems to ſerve the purpoſes of bringing an ulcer on to cicatrization, as well as any of the others. When the ulcer is incarned, the cure may be finiſhed as in other wounds; or if it do not cicatrize kindly, it may be waſhed with aq. calcis, or aq. phag. or dreſſed with a pledgit dipped in tinct. myrrhæ: and if excoriations are ſpread round the ulcer, they may be anointed with ſperm. cet. ointment, or unguent. nutritum.

The red precipitate has of late years acquired the credit it deſerves for the cure of ulcers, but by falling into general uſe, is often very unſkilfully applied; when mixed with the baſilicon, or what is neater, a cerate of wax and oil, it is moſt certainly a digeſtive, ſince it hardly ever fails to make the ulcer yield a thick matter in twenty-four hours, which diſcharged a thin one before the application of it. As greater proportions of it are added to the cerate, it approaches to an eſcharotic; but while it is mixed with any ointment, it is much leſs painful and corroſive than when ſprinkled on a ſore in powder; though in this form it is almoſt univerſally employed, but I think injudiciouſly; for as it is a ſtrong eſcharotic, much of it can never be uſed without making a ſlough, and therefore continually repeating it day after day, will be making a ſucceſſion of ſloughs; or if it be ſprinkled on a ſlough already formed, in order to quicken the ſeparation of it, ſo much of the powder as lies

lies on the dead ſurface, will be of no force, and the reſt that lies at the bottom, and about it, will produce other ſloughs there, by keeping under and deſtroying the little granulations of fleſh which in their growth would elevate and puſh off the firſt ſlough, ſo that it cannot be a proper remedy in this caſe. If it be anſwered, that daily practice ſhould convince us that precipitate has not this ill effect, ſince we ſee ſloughs continually ſeparating, notwithſtanding the uſe of it; the ſame ſort of argument may be uſed in favour of any bad practice, ſince nature often ſurmounts the greateſt obſtacles to a cure: but whoever will attend carefully, without any prejudice from this reaſoning, to the two methods of promoting the ſeparation of an eſchar, will find it not only more eaſily, but alſo more readily effected by ſoft digeſtives, or the precipitate medicine, than by a great quantity of the powder.

If the ulcer ſhould be of ſuch a nature as to produce a ſpongy fleſh, ſprouting very high above the ſurface, it will be neceſſary to deſtroy it by ſome of the eſcharotics, or the knife. This fungus differs very much from that belonging to healing wounds, being more eminent and lax, and generally in one maſs; whereas the other is in little diſtinct protuberances. It approaches often towards a cancerous complexion, and when it riſes upon ſome glands does actually degenerate ſometimes into a cancer, as has happened in buboes of the groin. When theſe excreſcences have ariſen in venereal ulcers, I have pared them with a knife; but the flux of blood is ordinarily ſo great, that I do not recommend the method, and rather prefer the eſcharotics. Thoſe in uſe are the vitriol, the lunar cauſtic, and the lapis infernalis, and more generally the red precipitate powder; but even in this caſe, I do not think that powder the beſt remedy; for though I have ſaid it is always an eſcharotic, yet the pulv. angel. which is a compoſition of the precipitate powder and burnt alum, eats deeper, and I think is preferable to the precipitate alone.

It is but ſeldom that theſe inveterate funguſes appear on an ulcer; but it is very uſual for thoſe of a milder kind to riſe, which may often be made to ſubſide with preſſure, and the uſe of mild eſcharotics; however, if the aſpect of the ſore be white and ſmooth, as happens in ulcers accompanied with a dropſy, and often in young women with obſtructions, it will anſwer no purpoſe to waſte the excreſcences till the conſtitution is repaired, when moſt probably they will ſink without any aſſiſtance. In ulcers alſo, where the ſubjacent bone is carious, great quantities of looſe flabby fleſh will grow up above the level of the ſkin; but as the caries is the cauſe of the diſorder, it will be in vain to expect a cure of the excreſcence, till the rotten part of the bone be removed; and every attempt with eſcharotics will be only a repetition of pain to the patient without any advantage. In ſcrophulous ulcers of the glands, and indeed of almoſt every part, this diſorder is very common; but before trial of the ſevere eſcharotics, I would recommend the uſe of the ſtrong precipitate medicine, with compreſs as tight as can be boren without pain, which I think generally keeps it under.

When the excreſcence is cancerous, and does not riſe from a large cancer, but only from the ſkin itſelf, it has been uſual to recommend the actual cautery; though I have found it more ſecure to cut away quite underneath, and dreſs afterwards with eaſy applications; but the caſes where either of theſe methods are practicable, occur very rarely. As to the treatment of incurable cancerous ulcerations, after much trial, ſurgeons have at laſt diſcovered, that what gives the moſt eaſe to the ſore is the moſt ſuitable application; and therefore the uſe of eſcharotics is not to be admitted on any pretence whatſoever; nor in thoſe

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ting, I think it may be laid
for a rule in all ſores, that
where the diſcharge is ſanious and corroſive, twice a-day is not too much: if the matter be not very putrid and thin, once will ſuffice. When the pain and inflammation are exceſſive, bleeding and other evacuations will often be ſerviceable; and above all things, reſt and a horizontal poſition; which laſt circumſtance is of ſo great importance to the cure of ulcers of the legs, that unleſs the patient will conform to it ſtrictly, the ſkill of the ſurgeon will often avail nothing; for as the indiſpoſition of theſe ſores is in ſome meaſure owing to the gravitation of the humours downwards, it will be much more beneficial to lie along than ſit upright, though the leg be laid on a chair; ſince even in this poſture they will deſcend with more force than if the body was reclined.

In ulcers of the legs accompanied with varices or dilatations of the veins, the method of treatment will depend upon the other circumſtances of the ſore; for the varix can only be aſſiſted by the application of bandage, which muſt be continued a conſiderable time after the cure; the neateſt bandage is the ſtraight ſtocking, which is particularly ſerviceable in this caſe; though alſo if the legs be œdematous, or if after the healing of the ulcers they ſwell when the patient quits his bed, it may be worn with ſafety and advantage. There are inſtances of one vein only being varicous, which when it happens may be deſtroyed by tying it above and below the dilatation; as in an ancuriſm; but this operation ſhould only be practiſed where the varix is large and painful.

Ulcers of many years ſtanding are very difficult of cure, and in old people the cure is often dangerous, frequently exciting an aſthma, a diarrhœa, or a fever, which deſtroys the patient unleſs the ſore break out again; ſo that it is not altogether adviſeable to attempt the abſolute cure in ſuch caſes, but only the reduction of them into better order,

and leſs compaſs, which, if they be not malignant, is generally done with reſt and proper care. The cure of thoſe in young people may be undertaken with more ſafety, but we often find it neceſſary to raiſe a ſalivation to effect it, though when completed it does not always laſt; ſo that the proſpect of cure in ſtubborn old ulcers, at any time of life, is but indifferent. In all theſe caſes, however, it is proper to purge once or twice a week with calomel, if the patient can bear it, and to make an iſſue when the ſore is almoſt healed, in order to continue a diſcharge the conſtitution has been ſo long habituated to, and prevent its falling upon the cicatrix, and burſting out again in that place.

When an ulcer or abſceſs has any ſinuſes or channels opening and diſcharging themſelves into the ſore, they are called ſinuous ulcers; theſe ſinuſes, if they continue to drain a great while, grow hard in the ſurface of their cavity, and then are termed fiſtulæ, and the ulcer a fiſtulous ulcer; alſo if matter be diſcharged from any cavity, as thoſe of the joints, the abdomen, &c. the opening is called a ſinuous ulcer, or a fiſtula.

The treatment of theſe ulcers depends on a variety of circumſtances; if the matter of the ſinus be thick, ſtrict bandage and compreſs will ſometimes bring the oppoſite ſides of the ſinus to a re-union; if the ſinus grow turgid in any part, and the ſkin thinner, ſhewing a diſpoſition to break, the matter muſt be made to puſh more againſt that part, by plugging it up with a tent; and then a counter-opening muſt be made, which proves often ſufficient for the whole abſceſs, if it be not afterwards too much tented, which locks up the matter, and prevents the healing; or too little, which will have the ſame effect; for dreſſing quite ſuperficially does ſometimes prove as miſchievous as tents, and for nearly the ſame reaſon, ſince ſuffering the external wound to contract into a narrow fice before the internal one b carned, does almoſt as effect lock up the matter as a tent: to ſerve then a medium in theſe caſ hollow tent of lead or ſilver m kept in the orifice, which at the time that it keeps it open, gives to the matter. The abſceſſes v the counter-openings are made frequently, are thoſe of comp fractures, and the breaſt; bu latter do oftener well without di tion than the former, though it be performed in both if practi the whole length of the abſceſs, after ſome trial the matter doe leſſen in quantity, and the ſides grow thinner; and if the ſinuſ fiſtulous, there is no expectatio cure without dilatation: there ar a great many ſcrophulous abſceſſ the neck, that ſometimes comm cate by ſinuſes running under indurations, in which inſta counter-openings are adviſeable, generally anſwer without the nece of dilating the whole length; indeed there are few abſceſſes in diſtemper, which ſhould be op beyond the thinneſs of the ſkin. W abſceſſes of the joints diſcharge th ſelves, there is no other metho treating the fiſtula, but by keepi open with the cautions already down, till the cartilages of the ex mities of the bones being corro the two bones ſhoot into one anot and form an anchyloſis of the j which is the moſt uſual cure of u in that part.

Gun-ſhot wounds often bec ſinuous ulcers, and then are to conſidered in the ſame light as t already deſcribed; though ſurge have been always inclined to conc there is ſomething more myſteri in theſe wounds than any oth but their terribleneſs is owing to violent contuſion and laceratio the parts, and often to the admi of extraneous bodies into them the bullet, ſplinters, clothes, &c. were any other force to do the ſ th

ng, the effect would be exactly the
ne as when done by fire-arms. The
atment of theſe wounds conſiſts in
noving the extraneous body as ſoon
poſſible, to which end the patient
ſt be put into the ſame poſture as
en he received the wound: if it
not be extracted by cutting upon
which ſhould always be practiſed
en the ſituation of the blood-veſſels,
does not forbid; it muſt be left
nature to work out, and the wound
ſſed ſuperficially; for we muſt not
ect, that if it be kept open with
ts, the bullet, &c. will return that
y; and there is hardly any caſe
ere tents are more pernicious than
e, becauſe of the violent tenſion
diſpoſition to gangrene which
ſently enſue. To guard againſt
rtification in this, and all other
lently-contuſed wounds, it will be
per to bleed the patient immedi-
y, and ſoon after give a clyſter;
part ſhould be dreſſed with ſoft
ſtives, and the compreſs and
er applied very looſe, being firſt
t in brandy or ſpirits of wine:
next time the wound is opened,
be dangerous, the ſpirituous fo-
tation may be employed, and
r that continued till the danger is
c. If a mortification comes on,
applications for that diſorder
t be uſed: in gun-ſhot wounds,
eldom happens that there is any
ſion of blood, unleſs a large veſſel
oren, but the bullet makes an
ar, which uſually ſeparates in a
days, and is followed with a
tiful diſcharge; but when the
nd is come to this period, it is
agcable by the rules already laid
n.

When an ulcer with looſe rotten
diſcharges more than the ſize of
ould yield, and the diſcharge is
and ſtinking, in all probability
bone is carious, which may eaſily
diſtinguiſhed by running the
e through the fleſh, and if ſo, it
lled a carious ulcer: the cure of
ulcers depends principally upon
emoval of the rotten part of the
bone, without which it will be im-
poſſible to heal, as we ſee ſometimes
even in little ſores of the lower jaw,
which taking their riſe from a rotten
tooth, will not admit of cure till the
tooth be drawn. Thoſe caries which
happen from the matter of abſceſſes
lying too long upon the bone, are
moſt likely to recover; thoſe of the
pox very often do well, becauſe that
diſtemper fixes ordinarily upon the
middle and outſide of the denſeſt
bones which admit of exfoliation;
but thoſe produced by the evil, where
the whole extremities or ſpongy parts
of the bone are affected, are exceed-
ingly dangerous, though all enlarged
bones be not neceſſarily carious; and
there are ulcers ſometimes on the ſkin
that covers them, which do not com-
municate with the bone, and conſe-
quently do well without exfoliation:
nay, it ſometimes happens, though
the caſe be rare, that in young ſub-
jects particularly, the bones will be
carious to ſuch a degree as to admit
a probe almoſt through the whole
ſubſtance of them, and yet afterwards
admit of a cure without any notable
exfoliation.

The method of treating an ulcer
with a caries, is by applying a cauſtic
of the ſize of the ſcale of the bone
that is to be exfoliated, and after
having laid it bare, to wait till ſuch
time as the carious part can, without
violence, be ſeparated, and then heal
the wound. Caution againſt vio-
lence, becauſe the little jagged bits
of bone that would be left, if we at-
tempted exfoliation before the piece
were quite looſe and diſengaged from
the ſound bone, would form little
ulcerations, and very much retard
the cure. In order to quicken the
exfoliation, there have been ſeveral
applications deviſed, but that which
has been moſt uſed in all ages, is the
actual cautery, with which ſurgeons
burn the naked bone every day, or
every other day, to dry up, as they
ſay, the moiſture, and by that means
procure the ſeparation; but as this
practice is never of great ſervice, and

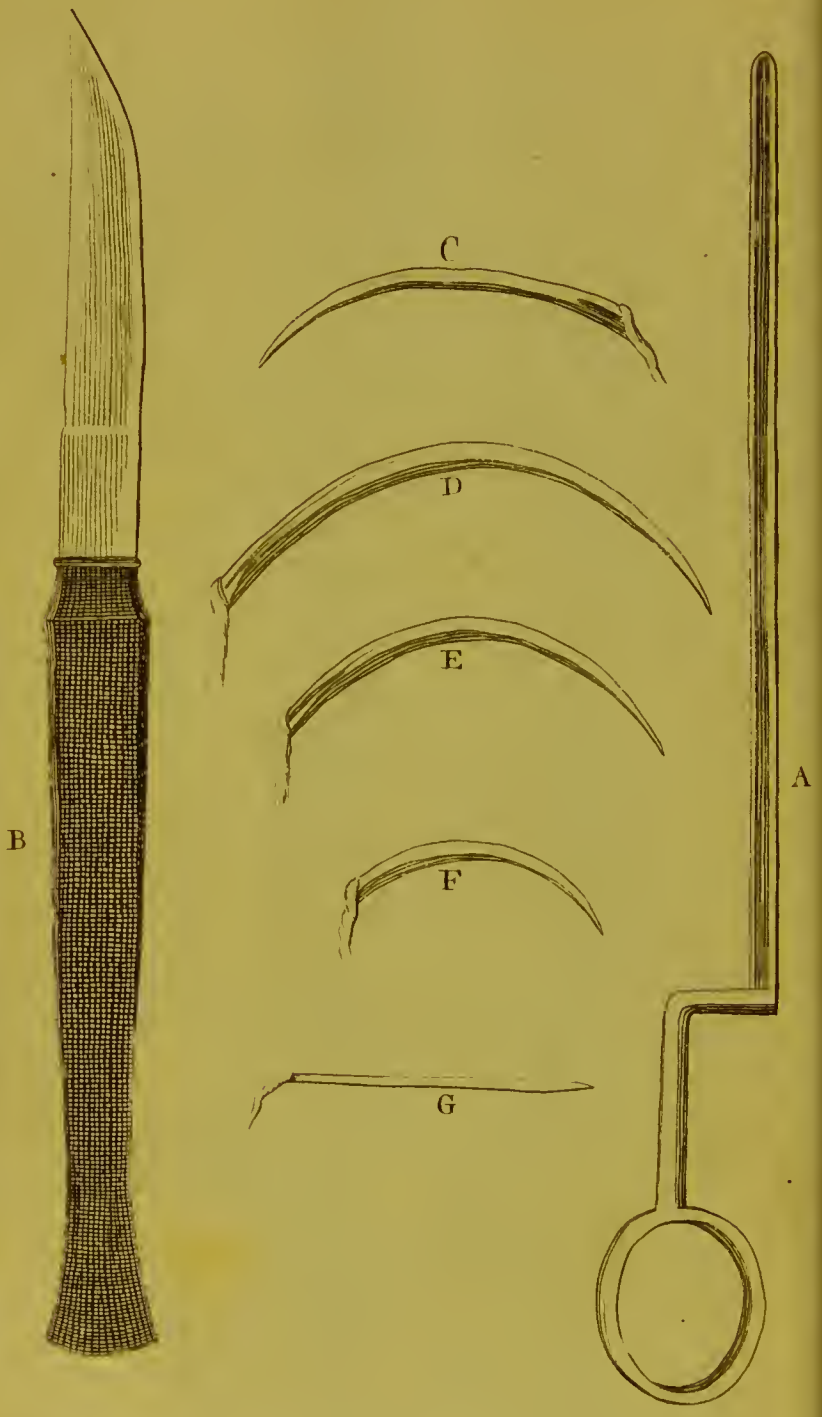
always cruel and painful, it is now pretty much exploded: indeed, from conſidering the appearance of a wound when a ſcale of bone is taken out of it, there is hardly any queſtion to be made, but that burning retards rather than haſtens the ſeparation; for as every ſcale of carious bone is flung off by new fleſh generated between it and the ſound bone, whatever would prevent the growth of theſe granulations, would alſo in a degree prevent the exfoliation, which muſt certainly be the effect of a red-hot iron, applied ſo cloſe to it; though the circumſtances of carious bones, and their diſpoſition to ſeparate, are ſo different from one another, that it is hardly to be gathered from experience, whether they will ſooner exfoliate with or without the aſſiſtance of fire; for ſometimes, in both methods, an exfoliation is not procured in a twelvemonth, and at other times it happens in three weeks or a month: nay, I have, upon cutting out the eſchar made by the cauſtic, taken away at the ſame time a large exfoliation: however, if it be only uncertain whether the actual cautery be beneficial or not, the cruelty that attends the uſe of it ſhould entirely baniſh it out of practice. It is often likewiſe, in theſe caſes, employed to keep down the fungous lips that ſpread upon the bone; but it is much more painful than the eſcharotic medicines; though there will be no need of either, if a regular compreſs be kept on the dreſſings; or at worſt, if a flat piece of the prepared ſponge, of the ſize of the ulcer, be rolled on with a tight bandage, it will ſwell on every ſide, and dilate the ulcer without any pain.

Some caries of the bones are ſo very ſhallow that they crumble inſenſibly away, and the wound fills up; but when the bone will neither exfoliate nor admit of granulations, it will be proper to ſcrape it with a rugine, or perforate it in many points with a convenient inſtrument down to the quick. In the evil, the bones of the carpus and tarſus are often affected, but their ſponginess is the reaſon that they are ſeldom cured: ſo that when theſe, or indeed the extremities of any of the bones, are carious through their ſubſtance, it is adviſable to amputate; though there are inſtances in the evil, but more eſpecially in critical abſceſſes, where, after long dreſſing down, the ſplinters, and ſometimes the whole ſubſtance of the ſmall bones, have worked away, and a healthy habit of body coming on, the ulcer has healed; but theſe are ſo rare, that no great dependence is to be laid on ſuch an event. The dreſſings of carious bones, if they are ſtinking, may be doſſils dipped in the tincture of myrrh, otherwiſe thoſe of dry lint are eaſieſt, and keep down the edges of the ulcer better than any other gentle applications.

Burns are generally eſteemed a diſtinct kind of ulcers, and have been treated with a greater variety of applications than any other ſpecies of ſore, every author having invented ſome new medicine to fetch out the fire, as they imagine; and indeed the conceit of a quantity of fire remaining in the part burnt, has occaſioned the trial of very whimſical and painful remedies; though people who talk thus ſeriouſly of fire in wounds, do not think of any remaining in a ſtick that is half burnt, and ceaſes to burn any farther; notwithſtanding the reaſoning be the ſame in burns of the fleſh and burns of a piece of wood.

When burns are very ſuperficial, not raiſing ſuddenly any veſication, ſpirits of wine are ſaid to be the quickeſt relief; but whether they be more ſerviceable than embrocations with linſeed-oil I am not certain, though they are uſed very much by ſome perſons whoſe trade ſubjects them often to this misfortune. If the burn excoriates, I think it is eaſieſt to roll the part up gently with bandages dipped in ſweet oil, or a mixture of unguent. flor. ſambu. with the oil: when the excoriations are very tender, dropping warm milk upon them every dreſſing is very com-

fortable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fortable; or if the patient can bear to have flannels wrung out of it, applied hot, it may be ſtill better: if the burn have formed eſchars, they may be dreſſed with baſilicon, though generally oil alone is eaſier; and in theſe ſores, whatever is the eaſieſt medicine, will be the beſt digeſtive. I have ſometimes found it neceſſary to apply different ointments to burns, where the aſpect has been nearly the ſame, and upon changing them, the patient has complained of great pain, ſo that we are obliged ſometimes to determine what is proper from trial. The moſt likely things to ſucceed at firſt, are oil, ungt. flor. ſamb. ungt. baſilicon, and a cerate of wax and oil, and afterwards the cerate de lapid. calam. ungt. rub. deſiccat. ungt. ſperm. cet. the nutritum with but little vinegar in it, or perhaps, when the fungus riſes, dry lint. There is great care neceſſary to keep down the fungus of burns, and heal the wound ſmooth, to which end the edges ſhould be dreſſed with lint dipped in aqu. vitriol. and dried afterwards; or they may be touched with the vitriol ſtone, and the dreſſings be repeated twice a day. There is alſo greater danger of contractions from burns after the cure, than from other wounds; to obviate which, embrocations of neats-foot oil, and bandage with paſte-boards, to keep the part extended, are abſolutely neceſſary, where they can be applied.

The EXPLANATION.

A. A director by which to guide the kniſe in the opening of abſceſſes that are burſt of themſelves, or firſt punctured with a lancet. This inſtrument ſhould be made either of ſteel, ſilver, or iron, but ſo tempered, that it may be bent and accommodated to the direction of the cavity. It is uſually made quite ſtraight; but that form prevents the operator from holding it firmly while he is cutting, upon which account I have given mine the ſhape here repreſented. The manner of uſing it, is by paſſing the thumb through the ring, and ſupporting it with the fore-finger, while the ſtraight-edged knife is to ſlide along the groove with its edge upwards, towards the extremity of the abſceſs.

B. The ſtraight-edged knife, proper for opening abſceſſes with the aſſiſtance of a director; but which, in few other reſpects, is preferable to the round-edged kniſe.

C. A crooked needle, with its convex and concave ſides ſharp. This is uſed only in the future of the tendon, and is made thin, that but few of the fibres of ſo ſlender a body as the tendon may be injured in the paſſing of it. The needle is large enough for ſtitching the tendo Achilles.

D. The largeſt crooked needle neceſſary for tying of any veſſels, and ſhould be uſed with a ligature of the ſize of that I have threaded it with in taking up the ſpermatic veſſels in caſtration, or the femoral and humeral arteries in amputation. This needle may alſo be uſed in ſewing up deep wounds.

E. A crooked needle and ligature of the moſt uſeful ſize, being not much too little for the largeſt veſſels, nor a great deal too big for the ſmalleſt; and therefore in the taking up of the greateſt number of veſſels in an amputation, is the proper needle to be employed. This needle alſo is of a convenient ſize for ſewing up moſt wounds.

F. A ſmall crooked needle and ligature for taking up the leſſer arteries, ſuch as thoſe of the ſcalp, and thoſe of the ſkin that are wounded in opening abſceſſes. Great care ſhould be taken by the makers of theſe needles, to give them a due temper; for if they are too ſoft, the force ſometimes exerted to carry them through the fleſh, will bend them; if they are too brittle they ſnap; both which accidents may happen to be terrible inconveniencies, if the ſurgeon be not provided with a ſufficient number of them. It is of great importance alſo to give them the form of part of a circle, which makes them paſs much more readily round any veſſel, than

if

If they were made partly of a circle, and partly of a ſtraight line; and in taking up veſſels at the bottom of a deep wound, is abſolutely neceſſary, it being impracticable to turn the needle with a ſtraight handle, and bring it round the veſſel when in that ſituation. The convex ſurface of the needle is flat, and its two edges are ſharp. Its concave ſide is compoſed of two ſurfaces, riſing from the edges of the needle, and meeting in a ridge or eminence, ſo that the needle has three ſides. This eminence of the ſubſtance of the needle on its inſide, ſtrengthens it very much, but it is not continued the whole length of the needle, which is flat towards the eye; ſome are made round in this part, but they cannot be held ſteady between the finger and thumb, and are therefore unfit for uſe. There have been needles made with the eminence on the convex ſide, and a flat ſurface on the concave ſide, but I do not ſee any particular advantage in that ſtructure. The beſt materials for making ligatures, are the flaxen thread that ſhoemakers uſe; which is ſufficiently ſtrong when four, ſix, or eight of the threads are twiſted together and waxed, and is not ſo apt to cut the veſſels as threads that are more finely ſpun; though the prevention of this accident will depend in a great meaſure on the dexterity of the operator, who is carefully to avoid the tying them with too great a force.

G. A ſtraight needle ſuch as glovers uſe, with a three-edged point, uſeful in the uninterrupted ſuture, in the ſuture of tendons, where the crooked one *C*, is not preferred, and in ſewing up dead bodies, and is rather more handy for taking up the veſſels of the ſcalp.

A

TREATISE

ON THE

OPERATIONS OF SURGERY.

CHAP. I.

OF SUTURES.

WHEN a wound is recent, and the parts of it are divided by a ſharp inſtrument, without any farther violence, and in ſuch a manner that they may be made to approach each other, by being returned with the hands, they will, if held in cloſe contact for ſome time, re-unite by inoſculation, and cement like one branch of a tree ingrafted on another. To maintain them in this ſituation, ſeveral ſorts of ſutures have been invented, and formerly practiſed, but the number of them has of late been very much reduced. Thoſe now chiefly deſcribed, are the interrupted, the glover's, the quilled, the twiſted, and the dry ſutures; but the interrupted and twiſted, are almoſt the only uſeful ones; for the quilled is never preferable to the interrupted; the dry ſuture is ridiculous in terms, ſince it is only a piece of plaſter applied in many different ways to re-unite the lips of a wound: and the glover's or uninterrupted ſtitch, which is adviſed in ſuperficial wounds, to prevent the deformity of a ſcar, does rather, by the frequency of the ſtitches, occaſion it, and is therefore to be rejected in favour of a compreſs and ſticking-plaſter; the only inſtance where I would recommend it, is in a wound of the inteſtine: the manner of making this ſuture I ſhall deſcribe in the chapter of Gaſtroraphy.

From the deſcription I have given of the ſtate of a wound proper to be ſewed up, it may be readily conceived, that wounds are not fit ſubjects for ſuture, when there is either a contuſion, laceration, loſs of ſubſtance, great inflammation, difficulty of bringing

bringing the lips into appoſition, or ſome extraneous body inſinuated into them; though ſometimes a lacerated wound may be aſſiſted with one or two ſtitches. It has formerly been forbidden to ſew up wounds of the head; but this precaution is very little regarded by the moderns; though the ill effects I have frequently ſeen from matter pent up under the ſcalp, and the great convenience there is of uſing bandage on the head, have convinced me, that much leſs harm would be done, if ſutures were uſed in this part with more caution.

If we ſtitch up a wound that has none of theſe obſtacles, we always employ the interrupted ſuture, paſſing the needle two, three, or four times, in proportion to the length of it, though there can ſeldom be more than three ſtitches required.

The method of doing it is this: the wound being emptied of the grumous blood, and your aſſiſtant having brought the lips of it together, that they may lie quite even, you carefully carry your needle from without, inwards to the bottom, and ſo on from within outwards, uſing the caution of making the puncture far enough from the edge of the wound, which will not only facilitate the paſſing the ligature, but will alſo prevent it from eating through the ſkin and fleſh; this diſtance may be three or four tenths of an inch: as many more ſtitches as you ſhall make, will be only repetitions of the ſame proceſs. The threads being all paſſed, you begin tying them in the middle of the wound, though if the lips are held carefully together all the while, as they ſhould be, it will be of no great conſequence which is done firſt. The moſt uſeful kind of knot in large wounds, is a ſingle one firſt; over this, a little linen compreſs, on which is to be made another ſingle knot, and then a ſlip-knot, which may be looſened upon any inflammation; but in ſmall wounds there is no danger from the double knot alone, without any compreſs to tie it upon; and this is moſt generally practiſed. If a violent inflammation ſhould ſucceed, looſening the ligature only will not ſuffice, it muſt be cut through and drawn away, and the wound be treated afterwards without any ſuture. When the wound is ſmall, the leſs it is diſturbed by dreſſing, the better; but in large ones, there will ſometimes be a conſiderable diſcharge, and if the threads be not cautiouſly carried through the bottom of it, abſceſſes will frequently enſue from the matter being pent up underneath, and not finding iſſue. If no accident happen, you muſt, after the lips are firmly agglutinated, take away the ligatures, and dreſs the orifices which they leave.

It muſt be remembered, that during the cure, the ſuture muſt be always aſſiſted by the application of bandage, if poſſible, which is frequently of the greateſt importance; and that ſort of bandage with two heads and a ſlit in the middle, which is by much the beſt, will in moſt caſes be found practicable.

The twiſted ſuture being principally employed in the hare-lip, I ſhall reſerve its deſcription for the chapter on that head.

CHAP. II.

OF THE SUTURE OF TENDONS.

WOUNDS of the tendons are not only known to heal again, but even to admit of ſewing up like thoſe of the fleſhy parts, though they do not re-unite in ſo ſhort a time. When a tendon is partly divided, it is generally attended with an exceſſive pain, inflammation, &c. in conſequence of the remaining fibres being ſtretched and forced by the action of the muſcle, which neceſſarily will contract more, when ſome of its reſiſtance is taken away: to obviate this miſchief, it has been hitherto an indiſputable maxim in ſurgery, to cut the tendon quite through, and immediately

iately afterwards perform the future; ut I do not think this practice adiſeable, for though the diviſion of ie tendon afford preſent caſe, yet ic mere flexion of the joint will ave the ſame effect, if, for example, : be a wound of a flexor tendon: eſides, in order to ſew up the extreities of the tendon when divided, ve are obliged to put the limb in ich a ſituation, that they may be rought into contact, and even to ıſtain it in that poſture to the finiſhng of the cure; if then, the poſture vill lay the tendon in this poſition, ve can likewiſe keep it ſo without ſing the future, and more ſure of its ot ſlipping away, which ſometimes appens from any careleſs motion of he joint, when the ſtitches have alnoſt worn through the lips of the vound; on which account, I would by all means adviſe, in this caſe, to orbear the future, and only to favour the ſituation of the extremities of the tendon, by placing the limb roperly.

If it ſhould be ſuggeſted, that, for vant of a farther ſeparation, there will not be inflammation enough to produce an adheſion of the ſeveral parts of the wound, which is particularly mentioned as the property of this ſort of cicatrix, though it be likewiſe of all others; I ſay, that the inflammation will be in proportion to the wound, and a ſmall wound is certainly more likely to recover than a large one. If it ſhould be objected, that keeping the limb in one poſture the whole time of the cure, will bring on a contraction of the joint, the objection is as ſtrong againſt the future; and now I am upon this ſubject, I would adviſe ſurgeons to be leſs apprehenſive of contractions after inflammations of the tendons, than practice ſhews they are: for perhaps there is hardly any one rule has done more miſchief than that of guarding againſt this conſequence; and I would lay it down as a method to be purſued at all times, to favour the joint in theſe diſorders, and keep it in that poſture we find moſt eaſy for the patient. The riſque of an immoveable contraction in ſix weeks, is very little, but the endeavour to avoid it has been the loſs of many a limb in half the time.

But when the tendon is quite ſeparated, and the ends are withdrawn from one another, having brought them together with your fingers, you may ſew them with a ſtraight triangular-pointed needle, paſſing it from without inwards, and from within outwards; in ſmall tendons, about three-tenths of an inch from their extremities, and in the tendo Achillis half an inch: I have ſometimes employed two threads in ſewing up the tendo Achillis, and I believe it is generally adviſable to do ſo, rather than to truſt to a ſingle future.

Some ſurgeons, for fear the muſcle ſhould contract a little notwithſtanding all our care, adviſe not to bring the ends of the tendon into an exact appoſition, but to lay one a little over the other, which allowing for the contraction that always enſues in ſome degree, the tendon will become a ſtraight line, and not be ſhortened in its length. As the wound of the ſkin will be nearly tranſverſe, I would not have it raiſed to, expoſe more of the tendon, but rather ſewed up with it, which will conduce to the ſtrength of the future. The knot of the ligature is to be made as in other wounds, and the dreſſings are to be the ſame: there is a ſort of thin crooked needle that cuts on its concave and convex ſides, which is very handy in the future of large tendons, and to be preferred to the ſtraight one. During the cure, the dreſſings muſt be ſuperficial, and the parts kept ſteady with paſteboard and bandage; the ſmall tendons re-unite in three weeks, but the tendo Achillis requires ſix at leaſt, and by violent exerciſe I have known it torn open at the end of ten weeks; though in the inſtance I allude to, I

brought the lacerated tendons to perfect re-union, without a future.

CHAP. III.

OF THE GASTRORAPHY.

THE account of this operation has engaged the attention of many furgical writers, and occafioned much debate about the proper rules for performing it; and yet what makes the greateft part of the defcription, can hardly ever happen in practice, and the reft but very feldom. I have been told that Du Verney, who was the moft eminent furgeon in the French army a great many years, during the wars and fafhion of duelling, declared he never had once an opportunity of practifing the gaftroraphy, as that operation is generally deferibed; for though the word, in ftrictnefs of etymology, fignifies no more than fewing up any wound of the belly, yet in common acceptation, it implies that the wound of the belly is complicated with another of the inteftine. Now the fymptoms laid down for diftinguifhing when the inteftine is wounded, do not with any certainty determine it to be wounded only in one place, which want of information, makes it abfurd to open the abdomen in order to come at it; if fo, the operation of ftitching the bowels can only take place where they fall out of the abdomen, and we can fee where the wound is, or how many wounds there are: if it happens that the inteftines fall out unwounded, the bufinefs of the furgeon is to return them immediately, without waiting for fpirituous or emollient fomentations; and in cafe they puff up fo as to prevent their reduction by the fame orifice, you may, with a knife or probe-fciffars, fufficiently dilate it for that purpofe, or even prick them to let out the wind, laying it down for a rule in this, and all operations where the omentum protrudes, to treat it in the method I fhall defcribe in the chapter on the Bubonocele.

Upon the fuppofition of the inteftine being wounded in fuch a manner as to require the operation (for in fmall punctures it is not neceffary) the method of doing it may be this: taking a ftraight needle with a fmall thread, you lay hold of the bowel with your left hand, and few up the wound by the glover's ftitch, that is, by paffing the needle through the lips of the wound, from within outwards all the way, fo as to leave a length of thread at both ends, which are to hang out of the incifion of the abdomen; then carefully making the interrupted future of the external wound, you pull the bowel by the fmall thread into contact with the peritonæum, in order to procure an adhefion, and tie them upon a fmall bolfter of linen; though I think it would be more fecure to pafs the threads with the ftraight needle through the lower edges of the wound of the abdomen, which would more certainly hold the inteftine in that fituation. In about fix days, it is faid, the ligature of the inteftine will be loofe enough to be cut and drawn away, which muft be done without great force; in the interim, the wound is to be treated with fuperficial dreffings, and the patient to be kept very ftill and low.

CHAP. IV.

OF THE BUBONOCELE.

WHEN the inteftine or omentum falls out of the abdomen into any part, the tumour in general is known by the name of *Hernia*, which is farther fpecified either from the difference of fituation, or the nature of its contents. When the inteftine or omentum falls through the navel, it is called a *Hernia umbellicalis*, or *Exomphalos*; when through the rings of the abdominal mufcles into the groin, *Hernia inguinalis*; or if into the fcrotum, *Scrotalis*: thefe two laft, tho' the

firſt only is properly ſo called, are own by the name of *Bubonocele*. ten they fall under the ligamen- a fallopii, through the ſame paſ- e that the iliac veſſels creep into thigh, it is called *Hernia femora-*

The bubonocele is alſo ſome- es accompanied with a deſcent of bladder: however, the caſe is ve- rare; but when it occurs, it is own by the patient's inability to ne, till the hernia of the bladder is uced within the pelvis. With re- d to the contents characteriſing ſwelling, it is thus diſtinguiſhed: the inteſtine only is fallen, it be- nes an *Enterocele*; if the omentum ploon) *Epiplocele*; and if both, *tero-Epiplocele*. There is beſides ſe, another kind of hernia men- ned and deſcribed by the moderns, en the inteſtine or omentum is in- ated between interſtices of the ſcles, in different parts of the bel-

This hernia has derived its ne from the place affected, and is led the *Hernia ventralis*; and laſt- there have been a few inſtances, ere the inteſtines or omentum have e fallen through the great foramen the iſchium into the internal part the thigh, between and under the erior heads of the triceps muſcle.

All the kinds of hernias of the in- ines and omentum, are owing to reternatural dilatation of the par- lar orifices through which they s, and not to a laceration of them, ich laſt opinion (together with a poſed laceration of the perito- um) has however prevailed ſo ch, as by way of eminence to give ne to the diſorder, which is known re by that of *rupture*, than by any thoſe I have here mentioned; on ich account I ſhall beg leave to ke uſe of it myſelf.

The rupture of the groin, or fero- a, is the moſt common ſpecies of nia, and in young children is ve- frequent, but it rarely happens in ancy that any miſchiefs ariſe from

For the moſt part, the inteſtine urns of itſelf into the cavity of the abdomen whenever the perſon lies down, at leaſt a ſmall degree of com- preſſion will make it. To ſecure the inteſtine when returned into its proper place, there are ſteel-truſſes now ſo artfully made, that, by being accom- modated exactly to the part, they per- form the office of a bolſter, without galling, or even ſitting uneaſy on the patient. Theſe inſtruments are of ſo great ſervice, that were people who are ſubject to ruptures always to wear them, I believe very few would die of this diſtemper; ſince it often ap- pears, upon enquiry, when we per- form the operation for the bubono- cele, that the neceſſity of the opera- tion is owing to the neglect of wear- ing a truſs.

In the application of a truſs to theſe kinds of ſwellings, a great deal of judgement is ſometimes neceſſary, and for want of it we daily ſee truſſes put even on buboes, indurated teſticles, hydroceles, &c.; but for the hernias I have deſcribed, I ſhall endeavour to lay down two or three rules, in order to guide more poſitively to the pro- priety of applying or forbearing them.

If there is a rupture of the inteſtine only, it is eaſily, when returned into the abdomen, ſupported by an inſtru- ment; but if of the omentum, not- withſtanding it may be returned, yet I have ſeldom found the reduction to be of much relief, unleſs there is only a ſmall quantity of it; for the omen- tum will lie uneaſy in a lump at the bottom of the belly, and, upon re- moval of the inſtrument, drop down again immediately; upon which ac- count, ſeeing the little danger and pain there is in this kind of hernia, I never recommend any thing but a bag- truſs, to ſuſpend the ſcrotum, and prevent, poſſibly by that means, the increaſe of the tumour. The differ- ence of theſe tumours will be diſtin- guiſhed by the feel; that of the omen- tum feeling flaccid and rumpled, the other more even, flatulent, and ſpringy.

Sometimes, in a rupture of both the inteſtine and omentum, the gut may

be reduced, but the omentum will ſtill remain in the ſcrotum; and when thus circumſtanced, moſt ſurgeons adviſe a bag-truſs only, upon a ſuppoſition that the preſſure of a ſteel one, by ſtopping the circulation of the blood in the veſſels of the omentum, would bring on a mortification; but I have learned, from a multitude of thoſe caſes, that if the inſtrument be nicely fitted to the part, it will be a compreſs ſufficient to ſuſtain the bowel, and, at the ſame time, not hard enough to injure the omentum; ſo that, when a great quantity of inteſtine falls down, though it be complicated with the deſcent of the omentum, the rupture will conveniently and ſafely admit of this remedy.

There are ſome ſurgeons, who, to prevent the trouble of wearing a truſs, when the inteſtine is reduced, deſtroy the ſkin over the rings of the abdominal muſcles with a cauſtic, of the ſize of a half-crown piece, and keep their patients in bed till the cure of the wound is finiſhed; propoſing by the ſtricture of the cicatrix to ſupport it in the abdomen for the future; but, by what I have ſeen, the event, tho' often ſucceſsful, is not anſwerable to the pain and confinement; for if, after this operation, the inteſtine ſhould again fall down, which ſometimes happens, there might poſſibly be more danger of a ſtrangulation than before the ſcar was made. This practice ſeems to be more adviſeable on women than men; becauſe in men, the danger of injuring the ſpermatic cord, ſometimes intimidates us from uſing a cauſtic of ſufficient ſtrength to do the proper office.

I have hitherto conſidered the rupture as eaſily moveable; but it happens frequently, that the inteſtine, after it has paſſed the rings of the muſcles, is preſently inflamed, which enlarging the tumour, prevents the return of it into the abdomen, and becoming every moment more and more ſtrangled, it ſoon tends to a mortification, unleſs we dilate the paſſages through which it has fallen, with ſome inſtrument, to make room for its return; which dilatation is the operation for the bubonocele.

It rarely happens that patients ſubmit to this inciſion before the gut is mortified, and it is too late to do ſervice; not but that there are inſtances of people ſurviving ſmall gangrenes, and even perfectly recovering afterwards. I myſelf have been an eye-witneſs of the cure of two patients, who, ſome time after the operation, when the eſchar ſeparated, diſcharged their fæces thro' the wound, and continued to do ſo for a few weeks, in ſmall quantities, when at length the inteſtine adhered to the external wound, and then was fairly healed.

In mortifications of the bowels, when fallen out of the abdomen into the navel, it is not very uncommon for the whole gangrened inteſtine to ſeparate from the ſound one, ſo that the excrement muſt neceſſarily ever after be diſcharged at that orifice: there are likewiſe a few inſtances, where the rupture of the ſcrotum has mortified, and become the anus, the patient doing well in every other reſpect; nay, I have had one inſtance of this nature under my care, in which the excrements were voided totally by the ſcrotum for three weeks or a month, yet by degrees, as the wound healed, they paſſed off chiefly in their natural courſe, and at laſt almoſt wholly ſo. Theſe caſes, however, are only mentioned to furniſh ſurgeons with the knowledge of the poſſibility of ſuch events, and not to miſlead them ſo far as to make favourable inferences with regard to gangrenes of the bowels, which generally are mortal.

Before the performance of the operation for the bubonocele, which is only to be done in the extremity of danger, the milder methods are to be tried; theſe are, ſuch as will conduce to ſoothe the inflammation; for as to the other intent of ſoftening the excrements, I believe it is much to be queſtioned, whether there can be any of that degree of hardneſs as to form

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the obſtruction; and, in fact, thoſe operators who have unluckily wounded the inteſtine, have proved, by the thin diſcharge of the fæces which has followed upon the inciſion, that the induration we feel, is the tenſion of the parts, and not the hardened lumps of excrement.

Perhaps except the pleuriſy, no diſorder is more immediately relieved by plentiful bleeding than this; clyſters repeated, one after another, three or four times (if the firſt or ſecond are either retained too long, or immediately returned) prove very efficacious; theſe are ſerviceable, not only as they empty the great inteſtines of their excrements and flatulences, which laſt are very dangerous, but they likewiſe prove a comfortable fomentation, by paſſing through the colon all around the abdomen. The ſcrotum and groin muſt, during the ſtay of the clyſter, be bathed with warm ſtoops wrung out of a fomentation; and after the part has been well fomented, you muſt attempt to reduce the rupture: for this purpoſe, let your patient be laid on his back, ſo that his buttocks may be conſiderably above his head; the bowels will then retire towards the diaphragm, and give way to thoſe which are to be puſhed in. If, after endeavouring two or three minutes, you do not find ſucceſs, you may ſtill repeat the trial: I have ſometimes, at the end of a quarter of an hour, returned ſuch as I thought deſperate, and which did not ſeem to give way in the leaſt, till the moment they went up; however, this muſt be practiſed with caution, for much rough handling will be pernicious.

If, notwithſtanding theſe means, the patient continues in very great torture, though not ſo bad as to threaten an immediate mortificaton, we muſt apply ſome ſort of pultice to the ſcrotum. That which I uſe in this caſe, is equal parts of oil and vinegar, made into a proper conſiſtence with oatmeal: after ſome few hours the fomentation is to be repeated, and the other directions put in practice; and if theſe do not ſucceed, I am inclined to think it adviſeable to prick the inteſtine in five or ſix places with a needle, as recommended by Peter Lowe, an old Engliſh writer, who ſays, he has often experienced the good effects of this method in the inguinal hernia, when all other means have failed.

After all, ſhould the pain and tenſeneſs of the part continue, and hiccoughs and vomitings of the excrements ſucceed, the operation muſt take place; for if you wait till a languid pulſe, cold ſweats, ſubſiding of the tumour, and emphyſematous feel come on, it will be moſt likely too late, as they are pretty ſure ſymptoms of a mortification.

To conceive rightly of the occurrences in this operation, it muſt be remembered, that in every ſpecies of rupture, a portion of the peritonæum generally falls down with whatever makes the hernia; which from the circumſtance of containing immediately the contents of the tumour, is called the *Sac* of the hernia. Now, the portion of the peritonæum, which uſually yields to the impulſion of the deſcending viſcera, is that which correſponds with the inmoſt opening of the abdominal muſcles, juſt where the membrana cellularis peritonæi begins to form the tunica vaginalis of the ſpermatic cord, ſo that the ſac with the viſcera inſinuate themſelves into the tunica vaginalis of the ſpermatic cord, and lie upon the tunica vaginalis of the teſticle: never theleſs, upon examination, I have alſo frequently found the contents of the hernia in contact with the teſticle itſelf, that is to ſay, within the tunica vaginalis of the teſticle; which I confeſs has ſurpriſed me, as one would imagine that it could not have been effected, but by burſting through the peritonæum. But a late diſcovery has offered an eaſy ſolution of this appearance; which is now eſtabliſhed as a fact, though eſteemed a few years ſince as incredible. It appears, by this

this discovery, that for some months during gestation, the testes of the fœtus remain in the abdomen, and when they descend into the tunica vaginalis, there is an immediate communication betwixt the cavity of the abdomen, and the cavity of the tunica vaginalis, which, in process of time, becomes obliterated by the coalition of the tunic with the cord; but if it happen, before the coalition be effected, that the intestine or the omentum fall into the scrotum, they will necessarily remain in contact with the test s: and in this manner, what we esteemed so extraordinary a phenomenon, is readily accounted for.

From this description of the descent of the viscera, it is evident that the herniary sac is contained within the tunica vaginalis, and ought to give the idea of one bag inclosing another; but in the operation, this distinction of coats does not always appear; for the herniary sac sometimes adheres so firmly to the tunica vaginalis, that together they make but one thick coat. This adhesion may possibly result from the present inflammation of the parts, which has rendered the operation necessary; but I am inclined to believe, that the herniary sac adheres in all bubonoceles which are not very recent, and that, when we restore the hernia into the abdomen, and support it by a truss, it is only the viscera, and not the herniary sac, which is reduced; at least I have found this to be the case in several that I have dissected.

The best way of laying your patient will be on a table about three feet four inches high, letting his legs hang down; then properly securing him, you begin your incision above the rings of the muscles, beyond the extremity of the tumour, and bring it down about half the length of the scrotum. through the membrana adiposa, which will require very little trouble to separate from the tunica vaginalis, and consequetly, will expose the rupture for the farther processes of the operation; but I cannot help once more recommending it as a thing of great consequence, to begin the external incision high enough above the rings, since there is no danger in that part of the wound: and for want of the room this incision allows, the most expert operators are sometimes tedious in making the dilatation. If a large vessel is opened by the incision, it must be taken up before you proceed farther.

When the tunica vaginalis is laid bare, you must cut carefully through it and the peritonæum, in order to avoid pricking the intestines; though, to say the truth, there is not quite so much danger of this accident as is represented; for sometimes the quantity of water separated in the sac of the peritonæum, raises it from the intestine, and prevents any farther mischief.

It has been considered by some as an improvement in the operation, where the disorder is recent, to forbear wounding the peritonæum, and to return the sac entire into the abdomen, thinking, by this means, to make a firmer cicatrix, and more surely to prevent a relapse for the future; but besides that it is often impracticable by reason of its adhesion, the seeming necessity there is of letting out the waters that are frequently fœtid, of taking out any part of the omentum that may possibly be mortified, and which we cannot come at without the incision, and lastly of leaving an opening for the issue of the excrements out of the wound, in case an eschar should drop from the intestine (all which accidents happen sometimes very early) put out of dispute, in my opinion, the impropriety of this method.

The peritonæum being cut through, we arrive to its contents, the nature of which will determine the next process: for if it is intestine only, it must directly be reduced; but if there is any mortified omentum, it must be cut off; in order to which it is advised to make a ligature above the part wounded, to prevent an hæmorrhage; but

but it is quite needleſs, and in ſome meaſure, pernicious, as it puckers up the inteſtine, and diſorders its ſituation, if made cloſe to it: for my part, I am very jealous that wounds of the omentum are dangerous, on which account I cannot paſs over this proceſs of the operation, without cautioning againſt cutting any of it away, unleſs it is certainly gangrened; and when that happens, I think it adviſable to cut off the mortified part with a pair of ſciſſars, near to the ſound part, leaving a ſmall portion of it to ſeparate in the abdomen; which may be done with as much ſafety as to leave the ſame quantity below a ligature.

When the omentum is removed, we next dilate the wound; to do which with ſafety, an infinite number of inſtruments have been invented; but in my opinion, there is none we can uſe in this caſe with ſo good management as a knife; and I have found my finger in the operation a much better defence againſt pricking the bowels, than a director which I intended to employ: the knife muſt be a little crooked, and blunt at its extremity, like the end of a probe. Some ſurgeons, perhaps, may not be ſteady enough to cut dexterouſly with a knife, and may therefore perform the inciſion with probe-ſciſſars, carefully introducing one blade between the inteſtine and circumference of the rings, and dilating upwards, and a little obliquely outwards. When the finger and knife only are employed, the manner of doing the operation will be by preſſing the gut down with the fore-finger, and carrying the knife between it and the muſcles, ſo as to dilate upwards about an inch, which will be a wound generally large enough; but if, upon examination, it ſhall appear that the inteſtine is ſtrangulated within the abdomen, which may poſſibly happen from a contraction of the peritonæum near the enterance into the ſac; in that caſe the inciſion muſt be continued through the length of the contracted channel, or the conſequence will be fatal, notwithſtanding the inteſtine be reſtored into the ſcrotum: on this account the operator ſhould paſs his finger up the ſac into the abdomen, after the reduction of the gut, in order to diſcover whether it be ſafely returned into its proper place.

The opening being made, the inteſtine is gradually to be puſhed into the abdomen, and the wound to be ſtitched up; for this purpoſe ſome adviſe the quilled, and others the interrupted future, to be paſſed through the ſkin and muſcles; but as there is not ſo much danger of the bowels falling out when a dreſſing and bandage are applied, and the patient all the while kept upon his back, but that it may be prevented by one or two ſlight ſtitches through the ſkin only, I think it by all means adviſeable to follow this method, ſince the ſtricture of a ligature in theſe tendinous parts may be dangerous.

Hitherto, in the deſcription of the bubonocele, I have ſuppoſed the contents to be looſe, or ſeparate in the ſac; but it happens ſometimes in an operation, that we find not only an adheſion of the outſide of the peritonæum to the tunica vaginalis, and ſpermatic veſſels, but likewiſe of ſome part of the inteſtines to its internal ſurface; and in this caſe there is ſo much confuſion, that the operator is often obliged to extirpate the teſticle, in order to diſſect away and diſentangle the gut, though if it can be done without caſtration it ought. I believe, however, this accident happens rarely, except in thoſe ruptures that have been a long time in the ſcrotum without returning: in which caſe the difficulty and hazard of the operation are ſo great, that unleſs urged by the ſymptoms of an inflamed inteſtine, I would not have it undertaken. I have known two inſtances of perſons ſo uneaſy under the circumſtance of ſuch a load in their ſcrotum, though not otherwiſe in pain, as to deſire the operation; but

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the event in both proved fatal; which I think ſhould make us cautious how we expoſe a life for the ſake of convenience only, and teach our patients to content themſelves with a bag-truſs when in this condition.

The dreſſing of the wound firſt of all may be with dry lint, and afterwards as directed in the Introduction.

The operation of the bubonocele in women ſo nearly reſembles that performed on men, that it requires no particular deſcription, only in them the rupture is formed by the inteſtine or omentum falling down through the paſſage of the ligamentum rotundum into the groin, or one of the labia pudendi: where cauſing the ſame ſymptoms as when obſtructed in the ſcrotum, it is to be returned by the dilatation of that paſſage.

CHAP. V.

OF THE EPIPLOCELE.

THERE have been a few inſtances where ſo great a quantity of the omentum has fallen into the ſcrotum, that by drawing the ſtomach and bowels downwards, it has excited vomitings, and the ſame train of ſymptoms as happen in a bubonocele, in which caſe the operation of opening the ſcrotum is neceſſary: the inciſion muſt be made in the manner of that for the rupture of the inteſtine, and the ſame rules obſerved with regard to the omentum, that are laid down in the laſt chapter. It is neceſſary alſo, the rings of the muſcles ſhould be dilated, or otherwiſe, though you have taken away ſome of the mortified part of the omentum, the reſt that is out of its place, and ſtrangled in the perforation, will gangrene alſo. The wound is to be treated in the ſame manner as that after the operation of the bubonocele. What I have here deſcribed as an inducement to the operation, ſhould, by the experience I have had, be the only one. There are a great many people, who are ſo uneaſy with ruptures, though they are not painful, that a little encouragement from ſurgeons of character will make them ſubmit to any means of cure; but as I have ſeen two or three patients, who were in every reſpect hale and ſtrong, die a few days after the operation, the event, though very ſurpriſing, ſhould be a leſſon, never to recommend this method of treating an epiplocele, unleſs it is attended with inflammation, &c.

CHAP. VI.

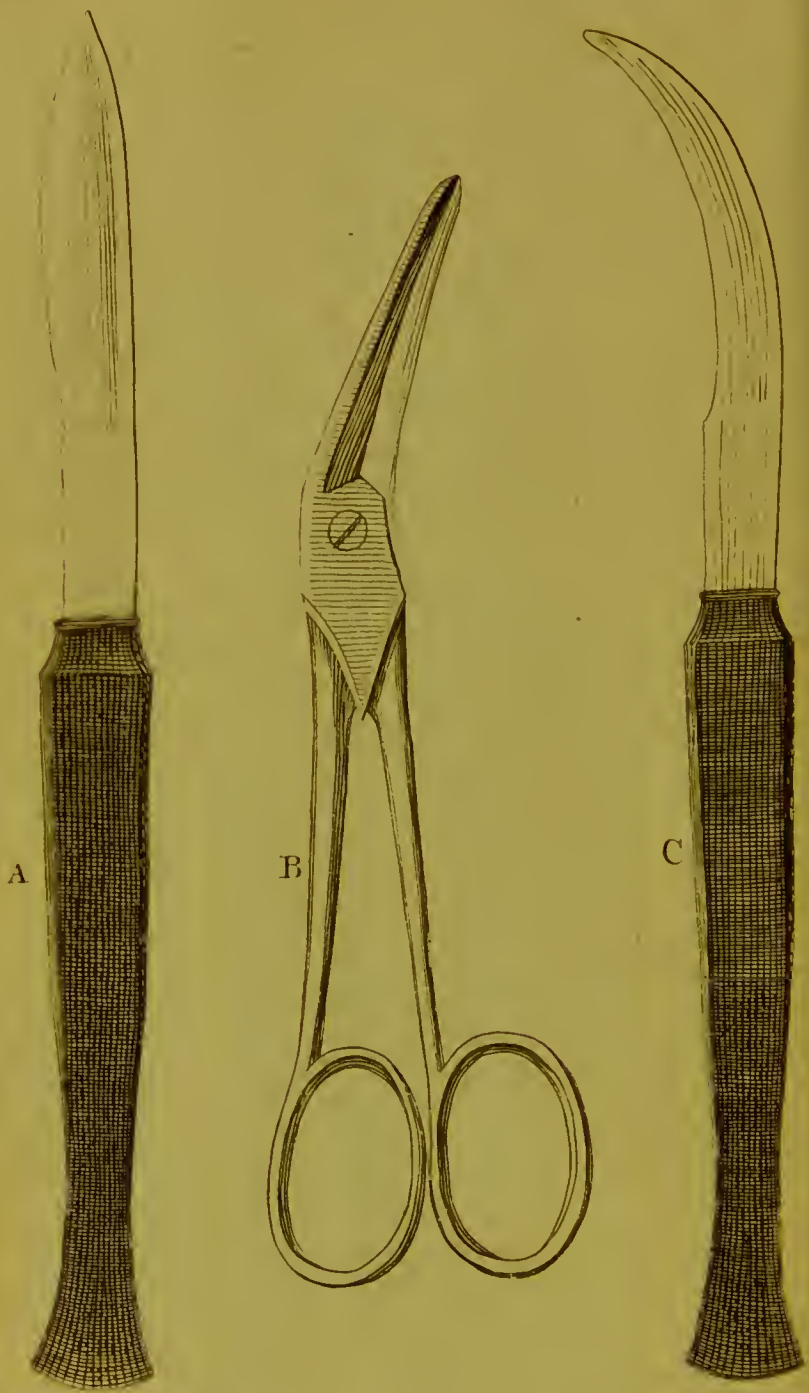
OF THE HERNIA FEMORALIS.

THIS ſpecies of rupture is the ſame in both ſexes, and formed by the falling of the omentum or inteſtine, or both of them, into the inſide of the thigh, through the arch made by the os pubis, and ligamentum fallopii, where the iliac veſſels and tendons of the pſoas and illiacus internus muſcles paſs from the abdomen. It is very neceſſary ſurgeons ſhould be aware of the frequency of this diſorder, which creates the ſame ſymptoms as other ruptures, and muſt firſt of all be treated by the ſame methods: the manner of operating in the reduction, is here too ſo exactly the ſame, with the difference of dilating the ligament inſtead of the rings of the muſcles, that it would be a mere repetition of the operation for the bubonocele to give any deſcription of it; only it may be obſerved, that the ſpermatic cord, as it enters into the abdomen, lies nearly tranſverſe to the inciſion, and cloſe in contact with the ligament, ſo that, unleſs you make the dilatation obliquely outwards, inſtead of perpendicularly upwards, you will probably divide thoſe veſſels.

CHAP. VII.

OF THE EXOMPHALOS.

THIS rupture is owing to a protruſion of the inteſtine, or omentum, or both of them, at the navel, and rarely


A
B
C

rely happens to be the subject of an peration; for though the case is mmon, yet most of them are gra- ially formed from very small be- nnings, and if they do not return to the abdomen upon lying down, all probability they adhere without ıy great inconvenience to the pa- ent, till some time or other an in- ammation falls upon the intestines, hich soon brings on a mortification, ıd death; unless, by great chance, c mortified part separates from the und one, leaving its extremity to rform the office of an anus. In this ncrgency, however, I think it ad- sable to attempt the reduction, if lled in at the beginning, though the iversal adhesion of the sac and its ntents, are a great obstacle to the ccess. The instance in which it is ost likely to answer, is, when the pture is owing to any strain, or sud- n jerk, and is attended with those forders which follow upon the stran- ılation of a gut.

In this case, having tried all other eans in vain, the operation is abso- tely necessary; which may be thus rformed:—Make the incision some- at above the tumour, on the left e of the navel, through the mem- ana adiposa; and then emptying e sac of its water, or mortified o- entum, dilate the ring with the ne crooked knife, conducted on ur finger, as in the operation for e bubonocele; after this, return e intestines and omentum into the domen, and dress the wound with- t making any ligature but of the n only.

CHAP. VIII.

OF THE HERNIA VENTRALIS

THE hernia ventralis which some- times appears between the recti ıscles is very large; but that tu- our which requires the operation, is dom bigger than a walnut, and is lisease not so common as to have been observed by many; but there are cases enough known to put a sur- geon upon enquiry after it, when the patient is suddenly taken with all the symptoms of a rupture, without any appearance of one in the navel, scro- tum, or thigh. I have before defined this hernia to be a strangulation of the gut, in some of the interstices of the muscles of the abdomen. The man- ner of dilating it will be the same as that before directed in the other her- nias. After the operation in this, and all hernias where the intestines have been reduced, it will be convenient to wear a truss, since the cicatrix is not always firm enough in any of them to prevent a relapse.

PLATE II.

THE EXPLANATION.

A. The round-edged knife, of a convenient size for almost all opera- tions where a knife is used. The make of it will be better understood by the figure than any other descrip- tion; only it may be remarked, that the handle is made of a light wood, as indeed the handles of all instru- ments should be, that the resistance to the blades may be better felt by the surgeon.

B. A pair of probe-scissars, which require nothing particular in their form, but that the lower blade should be made as small as possible, so that it is strong and has a good edge; be- cause, being chiefly used in fistulas in *ano*, the introduction of a thick blade into the sinus, which is gene- rally narrow, would be very painful to the patient.

C. The crooked knife, with the point blunted, used in the operation of the bubonocele.

CHAP. IX.

OF THE HYDROCELE.

THE Hydrocele, called also *Hernia Aquosa*, *Hydrops Scroti*, and *Hydrops Testis*, is a watery tumour.

of the ſcrotum; which, notwithſtanding the multiplicity of diſtinctions uſed by writers, is but of two kinds; the one, when the water is contained in the tunica vaginalis, and the other, when in the membrana cellularis ſcroti; this laſt is almoſt always complicated with an anaſarca, which ſpecies of dropſy is an extravaſation of the water lodged in the cells of the membrana adipoſa; and when thus circumſtanced, will not be difficult to be diſtinguiſhed; beſides that, it is ſufficiently characteriſed by the ſhining and ſoftneſs of the ſkin, which gives way to the leaſt impreſſion, and remains pitted for ſome time. The penis is likewiſe ſometimes enormouſly enlarged, by the inſinuation of the fluids into the membrana cellularis, all which ſymptoms are abſolutely wanting in the dropſy of the tunica vaginalis.

In the dropſy of the membrana cellularis ſcroti, the puncture with the trocar is recommended by ſome, and little orifices made here and there with the point of a lancet, by others; or a ſmall ſkane of ſilk paſſed by a needle through the ſkin, and out again at the diſtance of two or three inches, to be kept in the manner of a ſeton till the waters are quite drained; but the two firſt methods avail very little, as they open but two cells; and the laſt cannot be ſo efficacious in that reſpect as inciſions, and will be much more apt to become troubleſome, and even to gangrene.

Indeed it is not often proper to perform any operation at all upon this part, ſince the membrana cellularis ſcroti, being a continuation of the membrana adipoſa, ſcarifications made through the ſkin in the ſmall of the legs, will effectually empty the ſcrotum, as I have many times experienced; and this place ought rather to be pitched upon than the other, as being more likely to anſwer the purpoſe, by reaſon of its dependency; however, it ſometimes happens that the waters fall in ſo great quantities into the ſcrotum, as, by diſtending it, to occaſion great pain, and threaten a mortification: the prepuce of the penis alſo becomes very often exceſſively dilated, and ſo twiſted, that the patient cannot void his urine. In theſe two inſtances, I would propoſe an inciſion of three inches long, to be made on each ſide of the ſcrotum, quite through the ſkin into the cells containing the water, and two or three of half an inch long, in any part of the penis, with a lancet or knife; all which may be done with great ſafety, and ſometimes with the ſucceſs of carrying off the diſeaſe of the whole body. This I can poſitively ſay, that though I have done it upon perſons of a very languid condition, yet, by making the wound with a ſharp inſtrument, and treating it afterwards with fomentations and ſoft digeſtives, I have rarely ſeen any inſtance of a gangrene, which is generally ſo much apprehended in this caſe.

The dropſy of the tunica vaginalis, is owing to a preternatural diſcharge of that water which is continually ſeparating in a ſmall quantity on the internal ſurface of the tunic, for the moiſtening or lubricating the teſticle, and which, collecting too faſt, accumulates and forms, in time, a ſwelling of great magnitude: this is what I take to be the other ſpecies of hydrocele, and the only one beſides; though from the time of Celſus, down to our own days, the writers on this ſubject make two kinds; one on the inſide of the tunica vaginalis, and another between the ſcrotum and outſide of it; and among the cauſes aſſigned for this diſtemper, the principal one is the derivation of water from the aſcites, which opinion, though univerſally received, is abſurd in anatomy: for beſides that people afflicted with a hydrocele, are very ſeldom otherwiſe dropſical; and on the contrary, thoſe with an aſcites have no hydrocele; the tunica vaginalis is like a purſe totally ſhut up on the outſide of the abdomen, ſo that no water from any

part

irt can insinuate into it; and with ſpect to the notion of water falling om the abdomen into the tunica aginalis and ſcrotum, it is equally npoſſible; for though in the hernia ıteſtinalis the gut falls into this art, yet in that caſe the peritonæum which would hinder the egreſs of the ater) falls down too, which the ncients did not know, and the mo-erns have omitted to reflect on, in elation to this ſubject: it is true, iat where the aſcites is complicated ith a hernia inteſtinalis, or where iere has been a previous hernia of ie ſcrotum, and the ſac of the peri-onæum remains within the ſcrotum, ie water of the aſcites, in that caſe, iay fall into the ſac of the perito-æum, and in that manner form a umour of the ſcrotum; but this is ot properly a dropſy of the tunica aginalis. It muſt be here under-ood, that when I ſay there is no ommunication between the cavity of ie abdomen, and the cavity of the unica vaginalis, I ſpeak of adults; or in the fœtus, and even in an in-ant ſtate, there is a communication; nd in thoſe few inſtances, where the ommunication is preſerved to adult-eſs, the water of an aſcites may fall nto the tunica vaginalis; but this appens ſo rarely, that it ſhould not e conſidered as an impeachment of ie preceding doctrine.

The hydrocele of the tunica vagina-s, is very eaſily to be diſtinguiſhed om the hydrocele of the membrana ellularis, by the preceding deſcrip-on of that ſpecies of dropſy. I ſhall ow explain how it differs from the ther tumours of the ſcrotum, viz. ie bubonocele, epiplocele, and en-rged teſticle. In the firſt place, it ſeldom or never attended with pain the beginning, and is very rarely be imputed to any accident, as the ernias of the omentum and inteſtine re; from the time it firſt makes its ap-earance, it very ſeldom is known to iſappear or diminiſh, but generally ontinues to increaſe, though in ſome uch faſter than in others; in one perſon growing to a very painful diſtention in a few months, whilſt in another, it ſhall not be troubleſome in many years; nay, ſhall ceaſe to ſwell at a certain period, and ever after continue in that ſtate without any notable diſadvantage, though this laſt caſe very rarely happens: in proportion as it enlarges, it becomes more tenſe, and then is ſaid to be tranſparent; indeed the tranſparency is made the chief criterion of the diſtemper, it being conſtantly adviſed to hold a candle on one ſide of the ſcrotum, which, it is ſaid, will ſhine through to the other, if there be water: but this experiment does not always anſwer, becauſe ſometimes the tunica vaginalis is very much thickened, and ſometimes the water itſelf is not tranſparent; ſo that to judge poſitively if there be a fluid, we muſt be guided by feeling a fluctuation: and though we do not perhaps evidently perceive it, yet we may be perſuaded there is a fluid of ſome kind, if we were once aſſured that the diſtenſion of the tunica vaginalis makes the tumour, which is to be diſtinguiſhed in the following manner:—

If the inteſtine, or omentum, form the ſwelling, they will be ſoft and pliable (unleſs inflamed) uneven in their ſurface, particularly the omentum, and both of them extend themſelves up from the ſcrotum quite into the very abdomen; whereas in the hydrocele the tumour is tenſe and ſmooth, and ceaſes before, or at its arrival to, the rings of the abdominal muſcles; becauſe the upper extremity of the tunica vaginalis, terminates at ſome diſtance from the ſurface of the belly.

When the teſticle is increaſed in its ſize, the tumour is rounder, and if not attended with an enlargement of the ſpermatic veſſels, the cord may be eaſily diſtinguiſhed between the ſwelling and abdomen; but without this rule of diſtinction, either the pain, or the very great hardneſs, will diſcover it to be a diſeaſe of the teſticle.

As to the cure of this diſtemper by external applications, or internal means, after having tried upon a great variety of ſubjects, moſt of the medicines invented to that end, I have found but very little ſatisfaction in the event; for if by chance any one has mended under a phyſical regimen, it muſt be confeſſed too, that there are ſome inſtances of people recovering, who have ſo abſolutely neglected themſelves as not even to wear a bag-truſs; on which account I ſhould judge it adviſeable to wait with patience till the tumour becomes troubleſome, and then to tap it with a lancet or trocar. In opening with a lancet, it may poſſibly happen the orifice of the ſkin ſhall ſlip away from that of the tunic, and prevent the egreſs of the water; to obviate which inconvenience, you may introduce a probe, and by that means ſecure the exact ſituation of the wound; but if the coats are very much thickened, it will be adviſeable to uſe the trocar rather than the lancet. It is ſpoken of as an eaſy thing to hold the teſticle with the left hand, while we make the puncture with the right; but when the tunica vaginalis is very tenſe, it cannot well be diſtinguiſhed; however, I think there is no danger of wounding it, if you make the puncture in the inferior part of the ſcrotum. During the evacuation, the ſcrotum muſt be regularly preſſed; and after the operation, a little piece of dry lint and ſticking-plaſter are ſufficient.

This method of tapping, is called the palliative cure; not but that it does now and then prove an abſolute one. To prevent the relapſe of this diſeaſe, ſurgeons preſcribe the making a large wound, either by inciſion or cauſtic, and upon healing it afterwards, the firmneſs and contraction of the cicatrix may bind up the relaxed lymphatic veſſels, and obſtruct the farther preternatural effuſion of their contents: but by what I have ſeen of this practice, it is generally attended with ſo much trouble, that notwithſtanding its ſucceſs in the end, I believe whoever reads the following caſes, will be apt to diſcard the method, and abide rather by the palliative cure.

CASE I.

A. B. aged 44, a ſtrong man, never in his life having been ſubject to any other infirmity, put himſelf under my care for the relief of a hydrocele on the left ſide of the ſcrotum.

December 3, 1733, I diſcharged the water, by making an inciſion through the teguments about four inches long. Towards night he grew feveriſh, got no reſt, the ſcrotum and teſticle on that ſide beginning to inflame, and the capillary arteries (dilating) to bleed freely. He was ſeized too with a violent pain in the back, which was in a great meaſure removed by ſuſpending the ſcrotum with a bag-truſs.

From the 3d to the 7th, continued in a moſt dangerous condition, when the fever tended to a criſis, by the ſuppuration of both wound and teſticle.

From the 7th to the 24th, he daily acquired ſtrength; but the diſcharge from the teſticle increaſing, and the ſinus penetrating now very deep towards the ſeptum ſcroti, I opened the body of the teſticle the whole length of the abſceſs.

From the 24th, the diſcharge leſſened ſurpriſingly; ſo that in ſix days the ſurface of the greateſt part of the teſticle united with the ſcrotum, and there remained only a ſuperficial wound, which was entirely cicatriſed on Jan. 10, 1733-4.

March 31, 1737, he continued in perfect health.

CASE II.

In the year 1733, I made an inciſion through the ſcrotum and tunica vaginalis

ginalis of a boy about eight years of age, who narrowly escaped with his life: but the symptomatic fever terminating at last in an abscess of the scrotum, it proved his cure, though with some trouble, in a few weeks.

CASE III.

A. C. aged 37, of a very hale habit of body, had complained of a tumour on one side of the scrotum, which continuing to enlarge for six years, he applied to a surgeon, who laid a small caustic on the upper part of it, and opening the eschar, emptied near three pints of water; but he relapsing soon after this, I undertook the absolute cure.

December 15, 1736, I laid on the anterior and upper part of the scrotum, a caustic about six inches long, and one broad.

December 16, by a small puncture through the eschar, I emptied above a quart of water.

From the 17th to the 24th, he continued in a great deal of pain, not only in the part, but in his back and loins, and had very little rest; the scrotum on that side became exceedingly inflamed, and thickened, the symptomatic fever running very high, without any signs of the digestion of the wound.

On the 24th at night he grew a little easier, and continued so till the 29th, when the slough separated; but the wound retained still a bad aspect, no granulations appearing on its surface.

From December 29, to January 5, he remained in the same state.

From the 5th to the 13th, the swelling and pain rather increased, and that night he was seized with an ague-fit, which returned every other day twice more.

From the 17th to the 26th, the ague being stopped, he began to alter much for the better, two imposthumations on the scrotum being in this interim opened.

By February 2, the pain was quite gone, the tumour very much sunk, and the induration softened.

In a very few days after, the wound cicatrized; and on Feb. 24, I left him in perfect health, and free from any complaint.

Having in the preceding cases been seemingly threatened with the death of the patients, I tried the following experiment, upon the reputation of its having been done with success by others.

CASE IV.

A. D. aged forty-two, had for near four years been troubled with a hydrocele on one side, for which I had tapped him about twelve times, taking away near a pint of clear water each operation.

January 3, 1736-7, after having emptied the tunica vaginalis, I injected an ounce of spirit of wine; in the instant, he complained of great pain, which continued to increase, and the next day the teguments were very much augmented in their bulk and thickness.

January 7. The tension became violently painful, and perceiving a fluctuation, I made a puncture, by which he voided about half a pint of water, very deeply tinged with blood, but without any flavour of the spirits to be distinguished by the smell: this gave him some ease, but the inflammation and thickness continued a whole month, and then terminated in two abscesses on the forepart of the scrotum, which I opened the 7th of February following; and on their discharge, the whole tumour subsided, leaving a firm cicatrix and absolute cure of that disorder.

Something similar to *A. D.*'s bloody water, is the case of another person who was under my care: he had at considerable intervals of time been often tapped, discharging that sort of serous water the tunica vaginalis for the most part yields; at last it became tinged with blood, and every time grew more bloody than the other: the fourth discharge of this kind, was attended with a remarkable hæ-

hæmorrhage, and terminated in an abſolute cure; no ſigns of a relapſe appearing ſome months after, as I had an opportunity to inform myſelf.

To the caſes above recited, I could add ſtill more that have fallen within my knowledge, ſince the time I made theſe obſervations; particularly two, attended with inflammation and abſceſs, from the mere puncture of the lancet: both of which terminated in an abſolute cure. It may be remarked however of theſe two, that one was attended with a thickened tunic, and the water bloody; and in the other, the coat was thickened, and the epididymis enlarged and indurated from a former gonorrhœa.

I would not however be underſtood, from this catalogue of misfortunes, that the operation is never performed without much trouble; ſome examples I have known in its favour, but by no means enough to warrant the recommendation of it, unleſs to ſuch patients who are inconſoleable under the diſtemper, and are willing to ſuſtain any thing for a cure.

It is worth obſerving, that upon examination of the ſeveral hydroceles, it appeared evidently, their cure was wrought by an univerſal adheſion of the teſticle to the tunica vaginalis, and again of that coat to the parts enveloping it; from which obſervation it will not be difficult to conceive how it happens, that diſcharges of bloody water work a cure; ſince inflammations of membranes almoſt perpetually produce adheſions of the neighbouring parts, and theſe diſcharges are no other than a mixture of blood with the water from the ruptured veſſels of the inflamed tunic.

It has been ſuggeſted, that probably the expoſing the tunica vaginalis to the air, might occaſion the abovementioned diſorders; but beſides that the caſe of the injected ſp. vin. the caſe of the cauſtic, and the two punctures, are ſufficient anſwers to that opinion, the inſtances I have ſeen of the whole ſcrotum ſeparating in a gangrene from the tunica vaginalis, and leaving it naked a great many days without any ill effect, put it out of diſpute, that it is the mere inflammation of the tunic produces the danger. I have caſtrated ſeveral men, whoſe ſchirrhous teſticles were accompanied with a hydrocele, but the whole tunica vaginalis being carried off by the operation, they all recovered without any bad ſymptoms. I have here propoſed an incision only through the tunica vaginalis, as the means to effect a radical cure; but it has been ſaid, that to cut off a large portion of it, is a more effectual and a leſs dangerous operation; this fact I have lately taken under conſideration, but have not yet had ſufficient experience to form a poſitive opinion on the ſubject.

I ſhall finiſh this chapter with a farther remark on the ſuppoſed variety of hydroceles. Beſides the imaginary one already ſpecified between the ſcrotum and inferior membranes, there is mention made of a ſpecies of dropſy between the cremaſter muſcle and tunica vaginalis: but I judge it more likely to be within the tunica vaginalis of the cord, which adhering in different places to the ſpermatic veſſels, may form a cyſt or two between the adheſions, of which an inſtance has fallen under my own examination. Indeed, if we reflect on the cauſe of a dropſy of this part, we muſt neceſſarily confine it to the inſide of the membrane, where only is that order of veſſels which are the ſubject of the diſeaſe. The dropſy of the teſtis itſelf, is the laſt ſuppoſed ſpecies, but it is what I have never ſeen; and from the analogy of the teſtis, to the ſtructure of other glands, that are not pretended to become dropſical, I am ſuſpicious there is no ſuch diſtemper.

CHAP. X.

OF CASTRATION.

THIS is one of the moſt melancholy operations in the practice of ſurgery, ſince it ſeldom takes

place

place but in diſorders into which the patient is very apt to relapſe, viz. thoſe of a ſchirrhus, or cancer; for under moſt of the ſymptoms deſcribed as rendering it neceſſary, it is abſolutely improper; ſuch as a hydrocele, abſceſs of the teſtis, an increaſing mortification, or what is ſometimes underſtood by a ſarcocele; of which laſt it may not be amiſs to ſay a word. In the utmoſt latitude of the meaning of this term, it is received as a fleſhy ſwelling of the teſticle itſelf, called likewiſe hernia carnoſa; or in ſome enlargements, ſuch as in a clap, more frequently hernia humoralis; but generally ſpeaking, is conſidered as a fleſhy excreſcence formed on the body of the teſtis, which becoming exceedingly hard and tumefied, for the moſt part is ſuppoſed to demand extirpation, either by cutting or burning away the induration, or amputating the teſticle: but this maxim too precipitately received, has, I apprehend, very much miſguided the practitioners of ſurgery.

In order to conceive better of the diſtinction I am going to make, it muſt be remembered, that what is called the teſticle, is really compoſed of two different parts, one glandular, which is the body of the teſtis itſelf; and one vaſcular or membranous, known by the name of *epididymis*, which is the beginning of the vas deferens, or the collection of the excretory ducts of the gland.

Now it ſometimes happens that this part is tumefied, independent of the teſticle; and feeling like a large adventitious excreſcence, anſwers very well to the idea moſt ſurgeons form of a ſarcocele; but not being aware of the different nature and texture of the epididymis, they have frequently confounded its diſorders with thoſe of the teſticle itſelf, and equally recommended extirpation in the induration of one or the other. But without tiring the reader with particular hiſtories of caſes relating to this ſubject, I ſhall only ſay, that from diligent enquiry I have collected, that all indurations of the glandular part of the teſticle not tending to inflammation and abſceſs, generally, if not always, lead on to ſchirrhus and cancer; whereas, thoſe of the epididymis ſeldom or never do. It is true, in ſpite of internal or external means, theſe laſt often retain their hardneſs, and ſometimes ſuppurate, but, however, without much danger in either caſe.

It will not be hard to account for this difference of conſequences, from tumours of ſeemingly one and the ſame body, when we reflect how much it is the nature of cancerous poiſons to fix upon glands, and how different the epididymis is from a gland, though ſo nearly in the neighbourhood of one.

I would not have it ſuppoſed from what I have ſaid, that the epididymis never becomes cancerous; I confeſs it may, ſo may every part of the human body: but I advance, that it rarely or never is ſo, but from an affection of the glandular part of the teſticle firſt, which indeed ſeldom fails to taint, and by degrees to confound it in ſuch a manner, as to make one maſs of the two.

Before we caſtrate, it is laid down as a rule to enquire whether the patient has any pain in his back, and in that caſe to reject the operation, upon the reaſonable preſumption of the ſpermatic veſſels being likewiſe diſeaſed: but we are not to be too haſty in this determination; for the mere weight of the tumour ſtretching the cord, will ſometimes create the complaint. To learn the cauſe then of this pain in the back, when the ſpermatic cord is not thickened, let your patient be kept in bed, and ſuſpend his ſcrotum, in a bag-truſs, (which will relieve him, if diſordered by the weight only; but if the ſpermatic cord is thickened or indurated, which diſeaſe, when attended with a dilatation of the veſſels of the ſcrotum, is known by the Greek appellations *circocele* and *varicocele* the caſe is deſperate and not to be undertaken.

But

But ſuppoſing no obſtacle in the way to the operation, the method of doing it may be this:—Lay your patient on a ſquare table of about three feet four inches high, letting his legs hang down, which, as well as the reſt of the body, muſt be held firm by the aſſiſtants. Then, with a knife, begin your wound above the rings of the abdominal muſcles, that you may have room afterwards to tie the veſſels, ſince, for want of this caution, operators will neceſſarily be embarraſſed in making the ligature; then carrying it through the membrana adipoſa, it muſt be continued downward, the length of it being in proportion to the ſize of the teſticle. If it is very ſmall, it may be diſſected away without taking any part of the ſcrotum; but I am not very fond of this method, becauſe ſo much looſe flabby ſkin is apt to form abſceſſes afterwards, and very frequently grow callous. If the teſticle, for inſtance, weighs twenty ounces, having made one inciſion about five inches long, a little circularly, begin a ſecond in the ſame point as the firſt, bringing it with an oppoſite ſweep, to meet the other in the inferior part, in ſuch a manner as to cut out the ſhape of an oval, whoſe ſmalleſt diameter will be two inches. After this, diſſect away the body of the tumour with the piece of ſkin on it from the ſcrotum, firſt taking up ſome of the blood-veſſels, if the hæmorrhage is dangerous. Then paſs a ligature round the cord, pretty near the abdomen; and if you have ſpace between the ligature and teſticle, a ſecond about half an inch lower, to make the ſtoppage of blood ſtill more ſecure. The ligatures may be tied with what is called the ſurgeon's knot, where the thread is paſſed through the ring twice. This done, cut off the teſticle a little underneath the ſecond ligature, and paſs a needle from the ſkin at the lower part of the wound through the ſkin at the upper part, in ſuch manner as to envelope in ſome degree the ſound teſticle, which will greatly facilitate and quicken the cure; or, if one ſtitch will not anſwer the purpoſe, you may repeat it in ſuch part of the wound, where the ſkin on each ſide lies moſt looſe.

The method I have here deſcribed is what I have moſt frequently practiſed; but I think I have of late years performed the operation with more dexterity, where I have divided the teſticle from the cord, before I had diſſected away the ſkin from the body of the teſticle; for having had by this means an opportunity of laying hold of its upper part, I could ſeparate it from the ſcrotum with much more eaſe than without that advantage.

I once caſtrated a man whoſe teſticle weighed above three pounds, where ſome of the veſſels were ſo exceedingly varicous and dilated, as nearly to equal the ſize of the humeral artery; however, I took up two or three of the moſt conſiderable, and purſued the operation, cutting away near three-fourths of the ſkin, by which means I avoided a dangerous effuſion, as by dividing the veſſels before they were much rarefied, I had fewer ligatures to make. The ſucceſs anſwered the deſign, and the patient ſurvived the operation and healing of the wound; but the cancerous humour falling on his liver ſome time after, deſtroyed him.

In large tumours, ſuch as the laſt I have mentioned, it is adviſeable to cut away great part of the ſkin; for beſides that the hæmorrhage will be much leſs in this caſe and the operation greatly ſhortened, the ſkin, by the great diſtenſion having been rendered very thin, will, great part of it, if not taken away, ſphacelate, and the reſt be more prone to degenerate into a cancerous ulcer.

It may be obſerved, I do not, in order to avoid wounding the ſpermatic veſſels, recommend pinching up the ſkin before the inciſion, and afterwards thruſting the fingers between the membrana cellularis and the teſticle, to tear the one from the other; the

he firſt is not dextrous; and the other s painful; and both of them, in my pinion, are calculated to prevent hat there is little or no danger of.

CHAP. XI.

OF THE PHYMOSIS.

THE phymoſis ſignifies no more than ſuch a ſtraightneſs of the prepuce, that the glans cannot be denuded; which, if it becomes troubleome ſo as to prevent the egreſs of the rine, or conceal under it chancres of oul ulcers, quite out of the reach of pplication, is to be cut open. It ometimes happens that children are orn imperforate; in which caſe, a mall puncture, dreſſed afterwards ith a tent, effects a cure; but this peration is chiefly practiſed in venereal caſes, in order to expoſe chancres, either on the glans, or within de the prepuce itſelf: and here, if e prepuce is not very callous and ick, a mere inciſion will anſwer; hich may be made either with the iſſars, or by ſlipping a knife beveen the ſkin and glans to the very xtremity, and cutting it up. The ſt method is more eaſy than that of e ſciſſars, but it is ſafer to make the ound on one ſide of the prepuce an upon the upper part, for I have metimes ſeen the great veſſels on the orſum penis afford a terrible hæmorage, which may be avoided by following this rule; though the prepuce mains better ſhaped after an inciſion ade in the upper part, and therefore to be preferred by thoſe who unrſtand how to take up the veſſels.— children it ſometimes happens that e prepuce becomes very much contracted; and in that caſe, it is accidentally ſubject to ſlight inflammaons, which bring on ſome ſymptoms the ſtone; but the diſorder is alays removed by the cure of the phyoſis.

If the prepuce be very large and dilated, the opening alone will not ſuffice, and it is more adviſeable to take away the calloſity by circumciſion, which muſt be performed with a knife; and if the artery bleed much, it muſt be taken up with a ſmall needle and ligature. It may be worth remarking here, that in certain phymoſes, the prepuce becomes ſo thickened, and at the ſame time ſo elongated, that it reſembles the body of the penis, and has led ſome into the miſtake of ſuppoſing they had cut off a portion of the penis itſelf, when it was only a monſtrous phymoſis.

CHAP. XII.

OF THE PARAPHYMOSIS.

THE paraphymoſis is a diſeaſe of the penis, where the prepuce is fallen back from the glans, and cannot be brought forwards to cover it. There are many whoſe penis is naturally thus formed, but without any inconvenience; ſo that ſince the time of the Romans (ſome of whom thought it indecent to have the glans bare) it has not been uſual, as I can find, to perform any operation upon that account; but we read the ſeveral proceſſes of it deſcribed very particularly by Celſus, who does not ſpeak of it as an uncommon thing. Moſt of the inſtances of this diſtemper are owing to a venereal cauſe: but there are ſome, where the prepuce is naturally very tight, which take their riſe from a ſudden retraction of it, and immediate enlargement of the glans preventing its return. Sometimes it happens that the ſurgeon ſucceeds in the reduction immediately, by compreſſing the extremity of the penis, at the time he is endeavouring to advance the prepuce; if he does not, let him keep it ſuſpended, and attempt again, after having fomented, and uſed ſome emollient applications; but if, from the contraction below the corona glandis, there is ſo great a

ſtricture as to threaten a gangrene, or even if the penis is much enlarged by water in the membrana reticularis, forming tumours called cryſtallines, three or four ſmall inciſions muſt be made with the point of a lancet, into the ſtricture and cryſtallines, according to the direction of the penis; which, in the firſt caſe, will ſet free the obſtruction, and in the other evacuate the water. The manner of dreſſing afterwards, muſt be with fomentations, digeſtives, and the theriaca Londinenſis over the pledgets.

CHAP. XIII.

OF THE PARACENTESIS.

THIS operation is an opening made into the abdomen, in order to empty any quantity of extravaſated water, collected in that ſpecies of dropſy called the aſcites; but as there is much more difficulty in learning when to perform, than how to perform it, and indeed in ſome inſtances requires the niceſt judgement, I ſhall endeavour to ſpecify the diſtinctions which render the undertaking more or leſs proper.

There are but two kinds of dropſy, the anaſarca, called alſo leucophlegmacy, when the extravaſed water ſwims in the cells of the membrana adipoſa: and the aſcites, when the water poſſeſſes the cavity of the abdomen: in the firſt kind, the water is clear and limpid, but in the ſecond, a little groſſer, very often gelatinous and corrupted, and ſometimes even mixed with fleſhy concretions. I do not mention the tympany or flatulent dropſy of the abdomen; nor have I, in the chapter of Hernias, ſpoke of the hernia ventoſa, it being certain that the aſcites and bubonocele, have generally been miſtaken for thoſe diſeaſes; though there are ſome few inſtances where an enormous tumour of the abdomen ariſes from exceſſive flatulencies, and diſtenſions of the inteſtines.

It is of no great conſequence in the practice of phyſic or ſurgery, whether the water is diſcharged by a rupture of the lymphatics, or a tranſudation through the pores of their relaxed coats, ſince the fact is eſtabliſhed, that they have a power ſometimes of abſorbing the fluid, lying thus looſe, and conveying it into the courſe of the circulation; after which, it is often totally carried off by ſome emunctory of the body. The great diſpoſition there is in nature to fix upon the kidneys and glands of the inteſtines for this end, has put phyſicians upon promoting it by cathartics and diuretics, which ſometimes entirely carry off the diſtemper. If any one ſhould doubt of the poſſibility of a cure when the water is extravaſated, let him inject through a ſmall opening into the thorax or abdomen of a dog, a pint of warm water, and upon diſſection ſome few hours after, he ſhall not find one drop left there, which puts out of diſpute this power of abſorption; but indeed, though we do not much attend to it, it is by this very act the circulation is carried on regularly, with reſpect to ſome, if not all the ſecretions, which would overload their receptacles if they were not thus taken up again. The example ſerving for illuſtration, may be the circulation of the aqueous humour of the eye, which no one queſtions is an extravaſated fluid.

The operation of tapping is ſeldom the cure of the diſtemper: but dropſies, which are the conſequence of a mere impoveriſhment of the blood, are leſs likely to return than thoſe which are owing to any previous diſorder of the liver; and it is not uncommon for dropſies that follow agues, hæmorrhages, and diarrhœas, to do well; whereas in ſuch as are complicated with a ſchirrous liver, there is hardly an example of a cure.

The water floating in the belly is, by its fluctuation, to determine whether

her the operation be adviſeable; for f, by laying one hand on any part of he abdomen, you cannot feel an ndulation from ſtriking on an oppoite part with the other, it is to be reſumed there will be ſome obſtacle o the evacuation. It ſometimes happens that a great quantity, or almoſt ll the water, is contained in little bladders, adhering to the liver and he ſurface of the peritonæum, known by the name of hydatids, and the reſt of it in different-ſized ones, from the degree of a hydatid, to the ſize of a globe holding half a pint, or a pint of water. This is called the encyſted dropſy, and from the ſmallneſs of its cyſts, makes the operation uſeleſs, but is not difficult to be diſtinguiſhed, becauſe there is not a fluctuation of the water; unleſs it is complicated with an extravaſation.

When the fluctuation is hardly perceptible (except the teguments of the abdomen are very much thickened by an anaſarca) in all probability the fluid is gelatinous. I have had inſtances, where it was too viſcid to paſs through a common trocar, on which account it is proper to be furniſhed with a couple, of the ſize described in the copper-plate. I once tapped a perſon when the fluid would not paſs even through the large one; ſo to eaſe him from the diſtenſion he laboured under, I dilated the orifice with a large ſponge-tent, and afterwards extracted a prodigious quantity of diſtinct concreted hydatids, differing in nothing, as I could diſcover, from the nature of a polypus formed in the noſe.

There is another kind of dropſy, which for the moſt part forbids the operation, and is peculiar to women, being ſeated in the body of one or both ovaries. There is, I believe, no example of this ſpecies, but what may be known by the hardneſs and irregularity of the tumour of the abdomen, which is nearly uniform in the other caſes.

When the ovary is dropſical, the water is generally depoſited in a great number of cells formed in the body of it, which circumſtance makes the fluctuation inſenſible, and the perforation uſeleſs; tho' ſometimes there are only one or two cells, in which caſe, if the ovary is greatly magnified, the undulation will be readily felt, and the operation be adviſeable. I once tapped a gentlewoman in this circumſtance, whoſe ovary, upon the puncture, yielded but half a pint of water; but being ſtill perſuaded, by the feel, that there was a large cyſt, I tapped her in another part, and drew away near a gallon. I had an opportunity, after her death, to be convinced of this fact, by examining the body.

When the aſcites and anaſarca are complicated, it is ſeldom proper to perform the operation, ſince the water may be much more effectually evacuated by ſcarifications in the legs than by tapping.

Upon the ſuppoſition nothing forbids the extraction of the water, the manner of operating is this:—Having placed the patient in a chair of a convenient height, let him join his hands ſo as to preſs upon his ſtomach; then dipping the trocar in oil, you ſtab it ſuddenly through the teguments, and withdrawing the perforator, leave the waters to empty by the canula; the abdomen being, when filled, in the circumſtance of a bladder diſtended with a fluid, would make it indifferent where to wound; but the apprehenſion of hurting the liver, if it be much enlarged, has induced operators rather to chooſe the left ſide, and generally in that part which is about three inches obliquely below the navel. If the navel protuberates, you may make a ſmall puncture with a lancet through the ſkin, and the waters will be readily voided by that orifice, without any danger of a hernia ſucceeding, as is apprehended by many writers; though it ſhould be carefully attended to, whether the protuberance is formed by the water or an exomphalos, in which latter caſe the inteſtine would be wounded,

and not without the greateſt danger.

The ſurgeon neither in opening with the lancet, nor perforating with the trocar, need fear injuring the inteſtines, unleſs there is but little water in the abdomen, ſince they are too much confined by the meſentery, to come within reach of danger from theſe inſtruments; but it ſometimes happens, that when the water is almoſt all emptied, it is ſuddenly ſtopped by the inteſtine or omentum preſsing againſt the end of the canula; in which caſe you may puſh them away with a probe. During the evacuation, your aſſiſtants muſt keep preſsing on each ſide of the abdomen, with a force equal to that of the waters before contained there; for by neglecting this rule, the patient will be apt to fall into faintings, from the weight on the great veſſels of the abdomen being taken off, and the ſinking of the diaphragm ſucceeding, in conſequence of which, more blood flowing into the inferior veſſels than uſual, leaves the ſuperior ones of a ſudden too empty, and thus interrupts the regular progreſs of the circulation. To obviate this inconvenience, the compreſſion muſt not only be made with the hands during the operation, but be afterwards continued, by ſwathing the abdomen with a roller of flannel, about eight yards long, and five inches broad, beginning at the bottom of the belly, ſo that the inteſtines may be born up againſt the diaphragm: you may change the roller every day, till the third or fourth day, by which time the ſeveral parts will have acquired their due tone. For the dreſſing, a piece of dry lint and plaſter ſufficc; but between the ſkin and roller, it may be proper to lay a double flannel a foot ſquare, dipped in brandy or ſpirits of wine.

This operation, though it does not often abſolutely cure, yet it ſometimes preſerves life a great many years, and even a pleaſant one, eſpecially if the waters have been long collecting. I have known ſeveral inſtances of people being tapped once a month, for many years, who felt no diſorder in the intervals, till towards the time of the operation, when the diſtenſion grew painful; and there are inſtances, where the patient has not relapſed after it. Upon the whole, there is ſo little pain or danger in the operation, that, in conſideration of the great benefits ſometimes received from it, I cannot but recommend it as exceedingly uſeful.

PLATE III.

THE EXPLANATION.

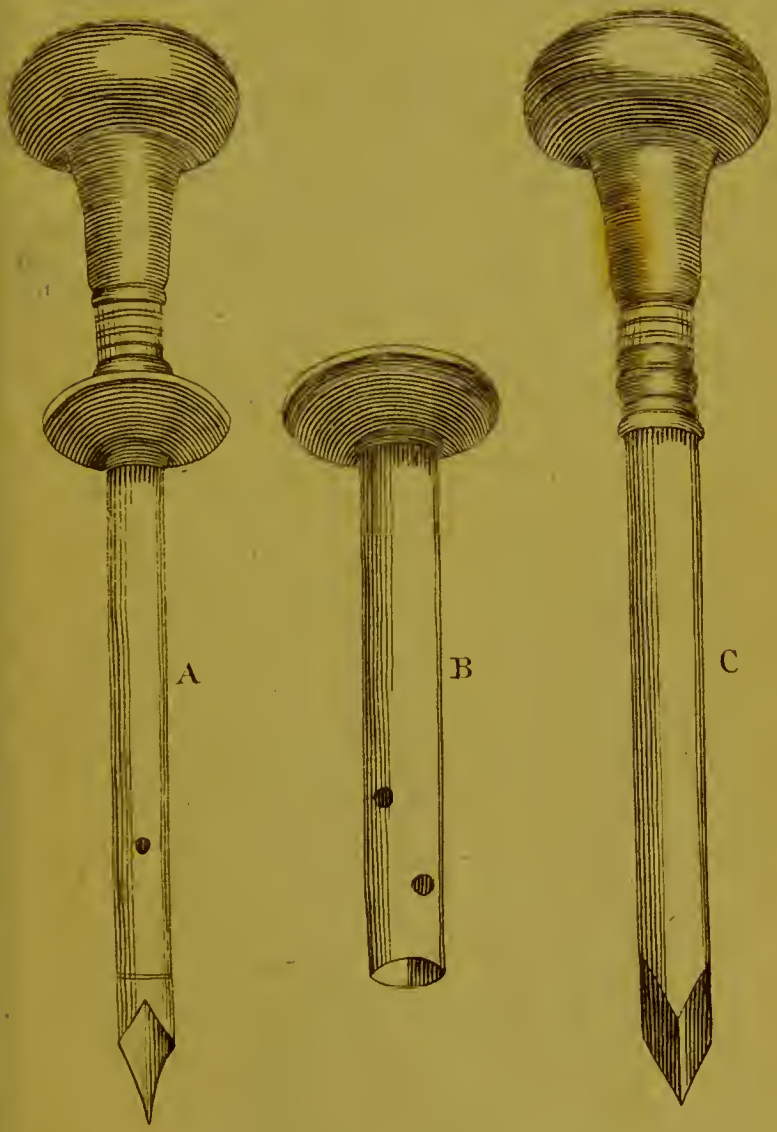
A. A trocar of the moſt convenient ſize for emptying the abdomen, when the water is not gelatinous. It is here repreſented with the perforator in the canula, juſt as it is placed when we perform the operation.

B. The canula of a large trocar, which I have recommended in caſes where the water is gelatinous.

C. The perforator of the large trocar.

The handle of the trocar is generally made of wood, the canula of ſilver, and the perforator of ſteel; great care ſhould be taken by the makers of this inſtrument, that the perforator ſhould exactly fill up the cavity of the canula; for unleſs the extremity of the canula lies quite cloſe and ſmooth on the perforator, the introduction of it into the abdomen will be very painful: to make it ſlip in more eaſily, the edge of the extremity of the canula ſhould be thin and ſharp; and I would recommend, that the canula be ſteel, for the ſilver one being of too ſoft a metal, becomes jagged or bruiſed at its extremity with very little uſe. After the operation, the canula muſt be wiped clean and dry, by drawing a ſlip or two of flannel through it; otherwiſe, when the perforator is put into it, they will both grow ruſty.

CHAP.


A
B
C

CHAP. XIV.

OF THE FISTULA IN ANO.

THE fiſtula in ano, without any regard to the ſtrict definition of the word, is generally underſtood to be an abſcefs, running upon or into the inteſtinum rectum; though an abſcefs in this part, when once ruptured, does generally, if neglected, grow callous in its cavity and edges, and becomes at laſt what is properly called a fiſtula.

That the anus is ſo often expoſed to this malady, in any criſis of the conſtitution, is chiefly aſcribed to the depending ſituation of the part; but what very much conduce to it likewiſe, are the great quantities of fat furrounding the rectum, and the preſſure the hæmorrhoidal veſſels are liable to, which being ſuſtained upon very looſe membranes, will be leſs able to reſiſt any effort that nature ſhall exert, to fling off a furcharge; and from one ſtep to another, that is, from inflammation to ſuppuration, lead on to the diſtemper we are treating of. That the fat is the proper ſubject of abſceſſes, may be learned from an inflammation of the ſkin affecting the membrana adipoſa, and producing matter there; in which caſe a ſuppuration frequently runs from cell to cell, and in a few days, lays bare a great quantity of fleſh underneath, without affecting the fleſh itſelf: nay, I think it may be doubted, whether in thoſe abſceſſes which are eſteemed ſuppurations of the muſcles, the inflammation and matter are not abſolutely firſt formed in this membrane, where it is inſinuated in the interſtices of their fibres.

The piles, which are little tumours formed about the verge of the anus, immediately within the membrana interna of the rectum, do ſometimes ſuppurate, and become the forerunners of a large abſcefs; alſo external injuries here, as in every other part of the body, may produce it; but from whatever cauſe the abſcefs ariſe, the manner of operating upon it will be according to the nature and direction of its cavity.

If the ſurgeon have the firſt management of the abſcefs, and there appear an external inflammation upon one ſide of the buttock only; after having waited for the proper maturity, let him with a kniſe make an inciſion the whole length of it; and in all probability, even though the bladder be affected, the largeneſs of the wound, and the proper application of doſſils lightly preſſed in, will prevent the putrefaction of the inteſtine, and make the cavity fill up like impoſthumations of other parts.

If the ſinus be continued to the other buttock, almoſt ſurrounding the inteſtine; the whole courſe of it muſt be dilated in like manner; ſince in ſuch ſpongy cavities, a generation of fleſh cannot be procured but by large openings; whence alſo, if the ſkin is very thin, lying looſe and flabby over the ſinus, it is abſolutely neceſſary to cut it quite away, or the patient will be apt to ſink under the diſcharge, which in the circumſtance here deſcribed, is ſometimes exceſſive. By this method, which cannot be too much recommended, it is amazing how happy the event is likely to be; whereas, from neglecting it, and truſting only to a narrow opening, if the diſcharge do not deſtroy the patient, at leaſt the matter by being confined corrupts the gut, and inſinuating itſelf about it, forms many other channels, which running in various directions, often baffle an operator, and have been the cauſe of a fiſtula being ſo generally eſteemed very difficult of cure.

Here I have conſidered the impoſthumation as poſſeſſing a great part of the buttock; but it more frequently happens, that the matter points with a ſmall extent of inflammation on the ſkin, and the direction of the ſinus is even with the gut: In this caſe, having made a puncture, you may with a probe learn if it has penetrated into the inteſtine, by paſſing your finger up it, and feeling the probe introduced

troduced through the wound into its cavity: though for the moſt part, it may be known by a diſcharge of matter from the anus. When this is the ſtate of the fiſtula, there is no heſitation to be made; but immediately putting one blade of the ſciſſars up the gut, and the other up the wound, ſnip the whole length of it. This proceſs is as adviſeable when the inteſtine is not perforated, if the ſinus is narrow, and runs upon or very near it; for if the abſceſs be tented, which is the only way of dreſsing it while the external orifice is ſmall, as I have here ſuppoſed, it will almoſt certainly grow callous; ſo that the ſureſt means of cure will be opening the gut, that proper applications may be laid to the bottom of the wound. However, it ſhould be well attended to, that ſome ſinuſes pretty near the inteſtine neither run into nor upon it, in which caſe they muſt be opened, according to the courſe of their penetration. There are abundance of inſtances, where the inteſtine is ſo much ulcerated, as to give free iſſue to the matter of the abſceſs by the anus; but I believe there are none where there is not, by the thinneſs and diſcolouration of the ſkin, or an induration to be perceived through the ſkin, ſome mark of its direction; which, if diſcovered, may be opened into with a lancet, and then it becomes the ſame caſe as if the matter had fairly pointed.

If the ſinuſes into and about the gut are not complicated with an induration, and you can follow their courſe, the mere opening with ſciſſars, or a knife guided on a director, will ſometimes ſuffice; but it is generally ſafer to cut the piece of fleſh, ſurrounded by theſe inciſions, quite away; and when it is callous, abſolutely neceſſary, or the calloſities muſt be waſted afterwards by eſcharotic medicines, which is a tedious and cruel method of cure.

When the fiſtula is of long ſtanding, and we have choice of time for opening it, a doſe of rhubarb the day before the operation will be very convenient, as it not only will empty the bowels but alſo prove an aſtringent for a while, and prevent the miſchief of removing the dreſsings in order to go to ſtool.

It ſometimes happens that the orifices are ſo ſmall, as not to admit the entrance of the ſciſſars; in which caſe, ſponge-tents muſt be employed for their dilatation.

In performing theſe operations on the anus, I do not think in general any inſtrument ſo handy as a knife and ſciſſars; almoſt all the others which have been invented to facilitate the work, are not only difficult to manage, but more painful to the patient; however, in thoſe inſtances where the fiſtula is very narrow, and opens into the inteſtines, juſt within the verge of the anus, the ſyringotomy may be uſed with advantage; but where the opening into the gut is high, it cannot be employed without giving great pain. I do not caution againſt cutting the whole length of the ſphincter, experience having ſhewn it may be done with little danger of an incontinence of excrement; and in fact the muſcle is ſo ſhort, that it muſt generally be cut through in dilatations of the inteſtine.

The worſt ſpecies of fiſtula is that communicating with the urethra, and ſometimes (through the proſtate gland) with the bladder itſelf. This generally takes its riſe from a former gonorrhœa, and appears externally firſt in perinæo, and afterwards increaſing more towards the anus, and even ſometimes into the groin, burſts out in various orifices through the ſkin, which ſoon becomes callous and rotten; and the urine, paſsing partly through theſe orifices, will often excite as much pain, and of the ſame kind, as a ſtone in the bladder.

This ſpecies of fiſtula taking its riſe from ſtrictures of the urethra, is only manageable by the bougie: for ſo long as the urethra is obſtructed, the cure of the fiſtula will be imperfect; but if the canal be opened by this

this application, it is amazing what obſtinate indurations and foul ſinuſes will in conſequence diſappear; though there are ſome ſo callous and rotten as to demand the knife and ſkilful dreſsings, notwithſtanding the urethra ſhould be dilated by the uſe of bougies.

CHAP. XV.

OF THE PUNCTURE OF THE PERINÆUM.

THIS operation is performed when the bladder is under ſuch a ſuppreſſion of urine as cannot be relieved by any gentler methods, nor by reaſon of the obſtruction in its neck, or the urethra, will admit of the introduction of the catheter. The manner of doing it, as deſcribed by moſt writers, is by puſhing a common trocar from the place where the external wound in the old way of cutting is made, into the cavity of the bladder, and ſo procuring the iſſue of the water through the canula; but others, refining upon this practice, have ordered an inciſion to be carried on from the ſame part into the bladder, and then to inſinuate the canula. But in my opinion, both the methods are to be rejected, in favour of an opening a little above the os pubis; for beſides that it is not eaſy to guide the inſtrument through the proſtate gland into the bladder, the neceſſity of continuing it, in a part already very much inflamed and thickened, ſeldom fails to do miſchief, and even to produce a mortification.

Some time ſince, a gentlewoman complained of a difficulty in making water, which ſhe voided by drops with exceſſive pain; and ſoon after, the urinary paſſage became totally obſtructed. Having in vain attempted to paſs the ſmalleſt catheter I could get, I introduced my finger into the vagina, and felt a very hard tumour about the neck of the bladder: the patient had not voided any water for five days, and being in the utmoſt agony, and, as we judged, within a few hours of dying, I put in practice the inciſion above the os pubis, making the wound of the ſkin about two inches long, and that of the bladder about half an inch: having emptied, by this means, a prodigious quantity of water, I kept the orifice open with a hollow tent, till ſuch time as the tumour ſubſided, which, with proper medicines, it did by degrees; and in about ſix weeks the water came the right way, and ſome time after ſhe recovered perfect health. I have lately practiſed a method ſtill more eaſy both to the patient and the operator, which conſiſts only in emptying the bladder with a common trocar, and ſtopping the canula with a little cork, which is afterwards to be taken out, as often as the patient has occaſion to urine. The canula is to be continued in the bladder till ſuch time as the perſon finds he can void his urine by the natural paſſage.

In this operation, the abdomen ought to be perforated about two inches above the os pubis; and if the patient be fat, the trocar ſhould penetrate two inches, otherwiſe, an inch and a half will be ſufficient. This precaution is of great importance, for I have ſeen an example, where the trocar being introduced nearer to the os pubis, the extremity of it preſſed upon the lower portion of the bladder, and in a few days made a paſſage into the rectum.

CHAP. XVI.

OF THE STONE.

STONY concretions are a diſeaſe incident to ſeveral parts of the body; but I ſhall treat only of thoſe formed in the kidneys and bladder: hitherto there has never been given any ſatisfactory account of the cauſes of this concreting diſpoſition in the fluids; and though there may be ſome propriety in conſidering the ſand of urine,

urine, in the ſame light as the tartar of wine, from their ſimilitude in ſeveral experiments, yet we cannot infer from thence, what does immediately produce it; at leaſt, it is not with any certainty to be imputed to a particular diet or climate, which, however, are the cauſes commonly aſſigned; ſince we ſee that in all countries, and among all ranks of people, as much among the ſober as the luxurious, the ſtone is a frequent diſtemper; and though the great numbers cut at the hoſpitals of Paris, where the water of the Seine is ſo remarkable for its quantity of ſtone, ſeems to favour the opinion of its being generated by particular fluids received into the blood, yet I believe, upon enquiry, this famous inſtance will not appear concluſive, ſince moſt of thoſe patients come from the provinces, or diſtant villages, where the water is not drank; and as to the inhabitants of Paris itſelf, by what I was able to learn of the ſurgeons there, the number of thoſe afflicted with the ſtone among them, is pretty nearly in the ſame proportion as in London: from which conſiderations, and the circumſtance of ſo many more children having the ſtone than men, one would be inclined to think the diſpoſition is much oftener born with us, than acquired by any external means. I once ſaw a ſtone in the kidney of a fœtus, at the term of ſeven months growth, which, had it lived, was two months before it would have been born.

It is certain the urine generally abounds with matter proper to compoſe a ſtone, and perhaps if it could grow cold in the bladder, it would always depoſit the matter there, as it does on the ſides of the chamber-pot, though the coats of the bladder being covered with a mucilage, makes them more unfit than the ſides of the pot, to attract the ſtony particles; but we ſee when once a hard body is inſinuated into the bladder, it ſeldom fails to become the nucleus of a ſtone, whether it be a large piece of gravel, a needle, a bullet, or any other firm extraneous ſubſtance, even grumous blood.

From the monſtrous increaſe of ſome ſtones in a ſhort time, and the ceſſation of growth for many years of others, we may be perſuaded that the conſtitution varies exceedingly at different times, with regard to theſe ſtony ſeparations; and from the appearances of moſt ſtones, when artfully ſawed through, we may gather that this variation of conſtitution does not ſhew itſelf only in the quantity of gravel added to the ſtone, but the quality of it alſo; ſo that a red uniform ſtone of an inch diameter, may perhaps, at half that ſize, have been a ſmooth white one; at a quarter, a brown mulberry one; and ſo on, at different times, altering in its ſpecies. Hence (from the appoſition of differently-coloured gravel) ariſes for the moſt part the laminated appearance of a ſtone; though ſometimes the laminæ are very nearly of the ſame colour and compoſition; and in this caſe, their formation ſeems to be owing to the want of accretion in the ſtone for a certain time, during which, its ſurface, by rubbing againſt the coats of the bladder, and its attrition from the ſtream of urine, becomes ſmooth and compact; ſo that when more freſh looſe gravel adheres to it, its different denſity in that part will neceſſarily make the ſtreaks we ſee in a ſection of the ſtone, which are only the external ſurfaces of each lamina.

That the ceaſing to grow gives them this laminated form, and not any particular diſpoſition in ſand to ſhoot into ſuch a ſhape, is probable from the examination of ſome other ſtones, in which a great quantity of gravel is firſt collected without any nucleus, into a ſpongy uniform maſs, and after that is covered with ſeveral laminæ.

It is no wonder that ſtones ſo generally form in the kidneys, ſince the diſpoſition of the urine will naturally ſhew itſelf as ſoon as it is ſeparated into the pelvis, that is, the ſtony particles

articles having as ſtrong an endeavour o unite with one another in the kid-eys as the bladder, will conſequently, rom meeting firſt there, generally roduce gravel and ſtone in that part; ay, I have found by opening the idneys of calculous people, that one is formed even earlier than I ave here ſuggeſted, for in them the buli belliniani were full of gravel.

Small ſtones and gravel are fre-uently voided without pain; but ometimes they collect and become ery large in the kidneys; in which aſe, a fit of the ſtone in that part is ie cure, from the inflammation and ain occaſioning convulſive twitches, hich at laſt expel them: but in this iſeaſe, the patient is very much re-eved by ſeveral kinds of remedies, ch as the mucilaginous, the ſapo-aceous, &c. ſome of which lubricate, d others both lubricate and ſtimu-tc. The ſand in paſſing through the reters, is very much forwarded by ie force of the urine, which is ſo nſiderable, that I have ſeen a ſtone at was obſtructed in the ureter in s firſt formation, perforated quite rough its whole length, and form a rge channel for the ſtream of urine. he ureters being very narrow, as ey run over the pſoas muſcle, and ſo at their entrance into the blad-er, make the movement of the ſtone ery painful and difficult in thoſe arts: but there is ſeldom ſo much ouble after the firſt fit; for when ce they have been dilated, they ge-erally continue ſo; I have often ſeen em as big as a man's finger, but ey have been found much larger.

When once a ſtone has acquired a oderate ſize in the bladder, it ſually occaſions the following com-laints; frequent inclination to make ater, exceſſive pain in voiding it drop y drop, and ſometimes a ſudden oppage of it, if diſcharged in a ream; after urining, great torture n the glans penis, which laſts one, vo, or three minutes; and in moſt onſtitutions, the violent ſtraining akes the rectum contract, and ex-

pel its excrements, or, if it be empty, occaſions a teneſmus, which is ſometimes accompanied with a prolapſus ani; the urine is often tinctured with blood from a rupture of the veſſels, and ſometimes pure blood itſelf is diſcharged; ſometimes the urine is very clear, but frequently there are great quantities of ſlimy ſediment depoſited at the bottom of it, which is no other than a preternatural ſeparation of the mucilage of the bladder, but has been often miſtaken for pus; whence has ariſen an opinion, that ulcers of the bladder are common, though, in fact, the diſtemper is very rare.

Theſe are the ſymptoms of the ſtone in the bladder, yet by no means are they infallible; ſince a ſtone in the ureter or kidneys, or an inflammation of the bladder from any other cauſe, will ſometimes produce the ſame effects: but if the patient cannot urine, except in a certain poſture, it is almoſt a ſure ſign the orifice is obſtructed by a ſtone; if he finds eaſe by preſſing againſt the perinæum with his fingers, or ſitting with that part upon a hard body, there is little doubt to be made that the eaſe is procured by taking off the weight of the ſtone; or laſtly, if with moſt of theſe complaints, he thinks he can feel it roll in his bladder, it is hardly poſſible to be miſtaken; however, the only ſure judgement to be formed, is from ſearching.

That we ſhould not readily diſtinguiſh the complaints of the ſtone from many other affections of the bladder, is not very ſurpriſing, when we reflect that a fit of the ſtone is nothing but an inflammation of its coats, which, though it be excited by the ſtone, requires a diſpoſition in the blood to produce it; for if the complaints in a fit were owing to the immediate irritation of the bladder, it ſhould follow, that the ſtone being always the ſame, the fit would be continual; but beſides that all patients have conſiderable intervals of eaſe (often of many months) except in

thoſe caſes where the ſtone is either very large or pointed, there are inſtances of ſome few happy conſtitutions, where they have no pain, even after having, for a certain time, ſuffered very much.

To prevent the violence, and frequent returns of the fits of the ſtone, bleeding and gentle purging with manna, are beneficial; abſtaining alſo from malt-liquors, and exceſs of eating and drinking, is very ſerviceable; but the milk-diet and honey are the greateſt preventives, not only of inflammation, but perhaps ſometimes too of the farther accretion of the ſtone.

From conſidering the diſorders of the ſtone in this light, and the frequent intervals of eaſe which happen without the aſſiſtance of medicine, we cannot wonder that ſo many patients have believed the ſtone diſſolved, when they have been under any particular regimen; and that in all ages there have been many people deceived for a length of time, by a ſuppoſed diſſolvent, though we have not hitherto known any ſafe one, till lately that lime and ſoap have been diſcovered to have ſometimes that effect.

CHAP. XVII.

OF SEARCHING.

THE patient being laid on a horizontal table, with his thighs elevated, and a little extended, paſs the ſound with the concave part towards you, till it meets with ſome reſiſtance in perinæo, a little above the anus; then turning it without much force, puſh it gently on into the bladder; and if it meets with any obſtruction at the neck, raiſe its extremity upwards, by inclining the handle of it towards you; or if it does not then ſlip in, withdraw it a quarter of an inch, and introducing your fore-finger into the rectum, lift it up, and it will ſeldom fail to enter: there is ſome art in turning the ſound in the proper place of the urethra, which ſurgeons not verſed in this operation, cannot ſo well execute; therefore they may paſs the inſtrument with the concave ſide always towards the abdomen of the patient, obſerving the ſame rule at the entrance into the bladder, as in the other method. The cauſe of this obſtacle, beſides the rugæ of the urethra, and the reſiſtance of the verumontanum, is ſometimes a ſmall projection of the orifice of the bladder in the urethra, like that of the os tincæ in the vagina, which occaſions the end of the ſound to ſlip a little beyond it.

It is not to be ſuppoſed that by ſearching, one can poſſibly judge of the ſize and form of a ſtone; and indeed the frequency of the fits, and violence of the ſymptoms, are a better rule to go by; though whoever ſhall think himſelf capable of diſtinguiſhing abſolutely the difference of ſtones, even by theſe circumſtances, will ſometimes be miſtaken; ſince the frequency and violence of the pain, depend not always merely upon their magnitude or ſhape; and there are ſome inſtances where a ſtone of ſix grains weight, has for ſeveral months given more pain in one perſon, than a much larger has in another; however, *cæteris paribus*, a large or rough ſtone, is worſe than a ſmall or a ſmooth one.

Though upon ſearching, we are aſſured of a ſtone in the bladder, we are not, without farther enquiry, to operate immediately; ſince there are ſometimes obſtacles which forbid the operation, either abſolutely, or only for a certain time; among theſe, that of great conſequence is the gravel or ſtone in the kidneys, which is known by the pain in the loins, vomitings, contractions of the teſticles, numbneſs of the thighs, and often by matter which the inflammation produces in the kidneys. The objections of leſs weight, and which frequently are removed, are a fit of the ſtone, a cough, a hectic, and being emaciated by

by long pain; exceſſive hot or cold weather, are likewiſe hinderances: but in extremity of danger, theſe laſt conſiderations may be diſregarded, though no doubt very hot weather is more inconvenient and dangerous than cold, as lying a-bed is then more troubleſome, and the urine much ſalter.

Difference of age makes an extreme difference in danger, infants and young people almoſt always recovering; but ſtill the operation is adviſeable on thoſe advanced in years, though it is not attended with near the ſame ſucceſs. This operation is performed four ſeveral ways, all which I ſhall deſcribe, with their particular inconveniencies, that we may the more eaſily pitch upon that which has the leaſt.

Before we perform any of them, it will be proper to prepare the patient with a gentle purge the preceding day, and a clyſter early in the morning, which will be of great ſervice in cooling the body, and making ſome of the operations leſs dangerous where the rectum is liable to be wounded when full.

CHAP. XVIII.

OF THE LESSER APPARATUS, OR CUTTING ON THE GRIPE.

THE moſt ancient way of cutting for the ſtone, is that deſcribed by Celſus, and known by the name of cutting on the gripe, though, ſince the time of Johannes de Romanis, it is alſo called, cutting with the leſſer apparatus, to diſtinguiſh it from his new method, which, on account of the many inſtruments employed in it, is called cutting with the greater apparatus. The manner of doing the operation is this: you firſt introduce the fore-finger and middle-finger of the left hand, dipped in oil, up the anus, and preſſing ſoftly with your right hand above the os pubis, endeavour to bring the ſtone towards the neck of the bladder; then making an inciſion, on the left ſide of the perinæum, above the anus, directly upon the ſtone, you turn it out through the wound, either with your fingers or a ſcoop.

This way of cutting was attended with many difficulties, for want of proper inſtruments to direct the inciſion, and extract the ſtone when it lay beyond the reach of the fingers, which in a large bladder was frequently the caſe; ſo that it is ſtrange Celſus confined the operation to the age between nine and fourteen, ſince it is much eaſier to be performed in infancy than at thoſe years; and it plainly appears from his account of it, that many died from the violence done to the bladder in endeavouring to bring the ſtone forwards, though the operators failed in their attempt, and the patients were not cut.

The wound of the bladder in this operation is made in the ſame place as is now practiſed in the lateral method; but it being impracticable on ſome ſubjects, and uncertain on all others, has made it univerſally exploded; ſo that no body now makes an inciſion without the direction of a ſtaff, unleſs a ſtone entirely prevents the introduction of it, by preſſing againſt, and ſtopping up the neck of the bladder; and in this caſe, when we cut directly upon the ſtone, it is much ſafer to puſh it back farther into the bladder, and lay hold of it with the forceps, than to endeavour with the ſcoop or fingers to force it outwards, which circumſtance alone makes it different from Celſus's method. It muſt be diſtinguiſhed however, when I ſpeak of puſhing the ſtone back, that I ſuppoſe it in the neck of the bladder; for it frequently happens that it lies at the extremity of the urethra, on the outſide of the bladder; in which caſe the wound of the urethra may be made large enough to turn it out with the fingers, or the end of ſome ſlender inſtrument.

CHAP. XIX.

OF THE GREATER APPARATUS, OR THE OLD WAY.

THIS method of cutting, invented by Johannes de Romanis, and publiſhed by his ſcholar Marianus in the year 1524, has at different times, and with different people, varied conſiderably in ſome of its proceſſes, and particularly with regard to the uſe of certain inſtruments. What I ſhall deſcribe, will be the manner in which it is now practiſed with all its improvements.

Having laid the patient on a ſquare horizontal table, three feet four inches high, with a pillow under his head, let his legs and thighs be bent, and his heels made to approach his buttocks, by tying his hands to the bottom of his feet with a couple of ſtrong ligatures, about two yards long; and to ſecure him more effectually from ſtruggling, paſs a double ligature under one of his hams, and carry the four ſtrings round his neck to the other ham; then paſſing the loop underneath it, make a knot by threading one of the ſingle ends through the loop: after this, the thighs being widened from each other, and firmly ſupported by proper perſons, you introduce the ſtaff, having firſt dipped it in oil, which muſt be held by your aſſiſtant, a little leaning on the left ſide of the ſeam in perinæo; and beginning the external wound juſt below the ſcrotum (which muſt be held out of the way) you continue it downwards, to within two fingers breadth of the anus; then leaving that direction, you ſlip the knife forwards in the groove, pretty far into the bulbous part of the urethra; or, as there is ſome danger of wounding the rectum, in the continuation of the inciſion you may turn the knife with the back towards it, and make this part of the inciſion from within outwards. Should a very large veſſel be cut, it will be adviſeable to tie it before you proceed any farther in the operation. When the wound is made, ſlide the gorget along the groove of the ſtaff into the bladder; and to do it with more ſafety, when the beak of it is received in the groove, it will be proper to take the ſtaff yourſelf in your left hand; for if the aſſiſtant ſhould, unwarily, either incline the handle of it too much towards you, or not reſiſt enough to the force of the gorget, it is very apt to ſlip out of the groove, between the rectum and the bladder, which accident is not only inconvenient to the operator for the preſent, but is attended for the moſt part with very bad conſequences. The gorget being paſſed, dilate the urethra and neck of the bladder with your fore-finger, and introduce the forceps into the bladder, keeping them ſhut till you touch the ſtone, when you muſt graſp it with a moderate force, and extract it by pulling downwards' towards the rectum. Should you find a difficulty in laying hold of the ſtone, be careful to keep your forceps in ſuch a poſition, that they may open upwards and downwards (not laterally) which will very much facilitate the embracing of the ſtone, in caſe it ſhould happen to be thin and flat.

CHAP. XX.

OF THE HIGH OPERATION.

THIS method of cutting for the ſtone was firſt publiſhed in the year 1561, by Pierre Franco, who, in his Treatiſe of Hernias, ſays he once performed it on a child with very good ſucceſs, but diſcourages the farther practice of it. After him, Roſſetus recommended it with great zeal, in his book intitled Partus Cæſareus, printed in 1591; but he never performed the operation himſelf. Monſieur Tolet makes mention of its having been tried in the Hotel Dieu; but without entering into the particular cauſes of its diſcontinuance, ſays only that it was found inconvenient.

nient. About the year 1719, it was firſt done in England by Mr. Douglas, and after him practiſed by others. The manner of performing it, with the improvements made ſince Franco's operation, is this:

The patient being laid on a ſquare table, with his legs hanging off, and faſtened to the ſides of it by a ligature paſſed above the knee, his head and body lifted up a little by pillows, ſo as to relax the abdominal muſcles, and his hands held ſteady by ſome aſſiſtants; inject through a catheter into the bladder as much barley-water as he can bear, which, in a [illegible], is often about eight ounces, and ſometimes twelve: for the more eaſily doing this, an ox's ureter may be tied to the extremity of the ſyringe, and handle of the catheter, which being pliable, will prevent any painful motion of the inſtrument in the bladder.

The bladder being filled, an aſſiſtant, in order to prevent the reflux of the water, muſt graſp the penis the moment the catheter is withdrawn, holding it on one ſide in ſuch a manner as not to ſtretch the ſkin of the abdomen; then with a round-edged knife make an inciſion about four inches long, between the recti and pyramidal muſcles, through the membrana adipoſa, as deep as the bladder, bringing its extremity almoſt down to the penis; after this, taking a crooked knife, continue the inciſion into the bladder, carrying it a little under the os pubis, and immediately upon the water's flowing out, introduce the fore-finger of your left hand, which will direct the forceps to the ſtone.

This method was at firſt received with great applauſe in London; but, after ſome trial, was rejected for the following inconveniencies:

It ſometimes happens that the bladder, notwithſtanding the injection, ſtill continues ſo deep under the os pubis, that the peritonæum being neceſſarily wounded firſt, the inteſtines puſh out immediately at the orifice, and the urine afterwards empties into the abdomen; in which caſe, hardly any recover. The injection itſelf is exceedingly painful, and however ſlowly the fluid be injected, it diſtends the bladder ſo much more ſuddenly than the urine from the kidneys does, and ſo much faſter than it can well bear, that it not only is ſeldom dilated enough to make the operation abſolutely ſecure, but is ſometimes even burſt, or at leaſt its tone deſtroyed by the haſty dilatation. What adds to the danger here, is the poſſibility of meeting with a contracted indurated bladder, which is a circumſtance ſometimes attending on the ſtone, and indeed an exceedingly dangerous one in all the other methods, but would be frightful in this, by reaſon not only of the neceſſity of wounding the peritonæum, but of the difficulty of coming at the ſtone. If the ſtone be very ſmall, it is hard to lay hold of it with the forceps, and in a fat man, the fingers are not long enough for that purpoſe. If there are many little ſtones, it will ſcarce happen that more than one at a time can be extracted; and if the ſtone breaks, it not only is impracticable to take it all away in the operation, but alſo from the ſupine poſture of the patient, it will generally remain in the bladder; whereas in the other methods, for the moſt part, it works itſelf out with the urine. But even ſuppoſing that the operation itſelf is proſperous, the conſequences generally are very troubleſome; for the urine iſſuing out at an orifice where there is no deſcent, ſpreads itſelf upon the abdomen, and makes very painful excoriations; though, what is ſtill worſe, it ſometimes inſinuates itſelf into the cells between the bladder and abdominal muſcles, and together with the inflammation excited by the operation, brings on a ſuppuration there, which is always difficult to manage, and frequently mortal.

CHAP.

CHAP. XXI.

OF THE LATERAL OPERATION.

THIS method was invented by an eccleſiaſtic, who called himſelf Frere Jaques. He came to Paris in the year 1697, bringing with him an abundance of certificates of his dexterity in operating; and making his hiſtory known to the court, and magiſtrates of the city, he got an order to cut at the Hotel Dieu, and the Charité, where he performed this operation to about fifty perſons. His ſucceſs did not anſwer the promiſes he had made; and from that time his reputation ſeems to have declined in the world, if we may give credit to Dionis, who has furniſhed us with theſe particulars.

He was treated by the ſurgeons of thoſe times as ignorant and barbarous; and though upon enquiry into the parts which ſuffer in this method, it was once the opinion of ſome of the moſt eminent among them, that it might be made a moſt uſeful operation, if a few imperfections in the execution of it were removed; yet, after having given this judgement, they ſuddenly dropped the purſuit, for no other reaſon, to all appearance, but that they would not be obliged to any one but a regular ſurgeon for a diſcovery of ſo great conſequence. The principal defect in his manner of cutting, was the want of a groove in his ſtaff, which made it difficult to carry the knife exactly into the bladder; nor did he take any care of his patients after the operation; ſo that for want of dreſſings, ſome of the wounds proved fiſtulous, and other ill conſequences enſued. But I am inclined to think he ſucceeded better, and knew more at laſt, than is generally imagined; for I remember to have ſeen, when I was in France, a ſmall pamphlet, publiſhed by him in the year 1702, in which his method of operation appeared ſo much improved, that it differed in nothing, or but very little, from the preſent practice. He had by this time learnt the neceſſity of dreſſing the wound after the operation, and had profited ſo much from the criticiſms of Meſſrs. Mery, Fagon, Felix, and Hunauld, that he then uſed a ſtaff with a groove; and what is more extraordinary, had cut thirty-eight patients ſucceſſively at Verſailles, without loſing one, as appeared by a certificate annexed to the piece.

Amongſt many that ſaw Frere Jaques operate, was the famous profeſſor Rau, who carried his method into Holland, and practiſed it with amazing ſucceſs. He never publiſhed any account of it himſelf, though he admitted ſeveral to his operations; but ſince his death, his ſucceſſor Albinus, profeſſor of anatomy and ſurgery at Leyden, has given the world a very circumſtantial detail of the ſeveral proceſſes of it, and mentions as an improvement upon Frere Jaques's manner, that he made his inciſion through the bladder beyond the proſtate; but whoever will try the experiment of making a wound in that place, without touching the proſtate, on a ſtaff, ſuch as Albinus has delineated, which is of an ordinary length, will find it almoſt impracticable; for if by inclining the ſtaff a little towards the abdomen and right groin, you endeavour to raiſe that part of the bladder towards the wound, it ſlips out all but the very end of it into the urethra, and leaves no direction for the knife. Beſides, that he cut the proſtate may be gathered from the event of ſome caſes which Mr. Cheſelden publiſhed, when he firſt undertook the lateral operation: he conſidered it as almoſt impoſſible to make the inciſion in this place, unleſs the bladder were diſtended, to which purpoſe he injected as much barley-water as the patient could ſuffer, which made it protuberate forwards, and lie in the way of the external wound; ſo that having the ſtaff in, he cut very eaſily upon it. The operations were exceedingly dextrous;

trous; but the wound of the bladder retiring back, when it was empty, did not leave a ready iſſue for the urine, which inſinuating itſelf amongſt the neighbouring muſcles and cellular membranes, deſtroyed four of the ten which he practiſed this method upon, and ſome of the others narrowly eſcaped.

If, therefore, this was the conſequence of a wound of the bladder beyond the proſtate, in ſo many inſtances, and we find by experience that it is exceedingly difficult in ſome men to carry the inciſion even ſo far as the proſtate, ſure it is poſſible that Albinus may be miſtaken in his deſcription, or even that Rau himſelf, if he was of that opinion, might be deceived in the parts he wounded; ſince we know it was generally thought, till within theſe few years, that the bladder itſelf was cut in the old way.

After this unſucceſsful trial, Mr. Cheſelden made uſe of the following method, which is now the practice of moſt Engliſh operators:

The patient being laid on a table, with his hands and feet tied, and the ſtaff paſſed as in the old way, let your aſſiſtant hold it a little ſlanting on one ſide, ſo that the direction of it may run exactly through the middle of the left erector penis and accelerator urinæ muſcles; then make your inciſion through the ſkin and fat, very large, beginning on one ſide of the ſeam in perinæo, a little above the place wounded in the old way, and finiſhing a little below the anus, between it and the tuberoſity of the iſchium: this wound muſt be carried on deeper between the muſcles, till the proſtate can be felt, when ſearching for the ſtaff, and fixing it properly, if it has ſlipped you muſt turn the edge of the knife upwards, and cut the whole length of that gland from within outwards, at the ſame time puſhing down the rectum with a finger or two of the left-hand; by which precautions the gut will always eſcape wounding; after which, the operation finiſhes nearly in the ſame manner as with the greater apparatus.

If, upon introducing the forceps, you do not perceive the ſtone readily, you muſt lift up their handle, and feel almoſt perpendicularly for it, ſince for the moſt part when it is hard to come at, it lies in one of the ſinuſes ſometimes formed on each ſide of the neck of the bladder, which project forward in ſuch a manner, that if the ſtone lie there, the forceps paſs beyond it the moment they are through the wound; ſo that it would be impoſſible to lay hold of it, or even to feel it, if not aware of this circumſtance.

When the ſtone breaks, it is much ſafer to take away the fragments with the forceps, than to leave them to be diſcharged with the urine; and if the pieces are very ſmall, like ſand, a ſcoop is the beſt inſtrument; though ſome prefer the injecting barley-water into the bladder, which ſuddenly returning, brings away the broken particles of the ſtone.

As there are hardly any inſtances of more ſtones than one, when the ſtone taken away is rough; ſo when it is ſmooth and poliſhed in any part of it, it is almoſt a certain ſign of others behind; on which account, an operator ſhould be careful, in that caſe, to examine not only with his fingers, but ſome convenient inſtrument, for the remaining ones; though indeed, in all caſes, it may be proper to examine the bladder after the extraction of a ſtone; becauſe it is poſſible there may be a ſecond ſtone, notwithſtanding the firſt be rough.

The great inconvenience of the lateral operation is the hæmorrhage which ſometimes enſues in men; for in children the danger of it is not worth mentioning; this however is the principal objection which has prevented it being univerſally practiſed; but in all likelihood it will be more general, when the merits of the method are better known, and it is once diſcovered that the ill conſequence of moſt of theſe hæmorrhages is owing more

more to an error in operating than to the nature of the operation; for I think I can pofitively fay, that all thofe branches of the hypogaftric artery which lie on this fide of the proftate, may be taken up with the needle, if the wound be made large enough to turn it about freely at the bottom; yet this is a circumftance that many furgeons have been deficient in, and inftead of making it three or four inches long in a man, they have fometimes made it not above an inch; in which cafe, it is not only impoffible to tie the veffels between the fkin and bladder, but it alfo prevents the proper application of lint, or ftyptics to the artery creeping on the proftate: fo that it is not furprifing the operation fhould be difcountenanced, when the practice of it is attended with this difficulty.

I have here mentioned lint, or ftyptics, as a proper application to ftop the hæmorrhage from the artery of the proftate; but if they fhould not prove effectual, I would advife the introduction of a filver canula through the wound into the bladder, which fhould be three or four inches long, according to the depth of the wound; and almoft as thick as a man's little finger. It muft be covered with rag or lint (that it may lie foft) and continue in the bladder two or three days before it is taken away.

If in the operation any very large veffel of the external wound fhould be divided, it is advifeable to tie it before the extraction of the ftone; but the neceffity of doing this does not occur once in twenty times: it rarely happens that the veffels of the proftate burft open any conficderable time after the operation, if they did not bleed during the performance of it; but as it is the nature of the fymptomatic fever to dilate the veffels, and quicken the motion of the blood, it is proper to be upon our guard, efpecially in plethoric people, and endeavour to obviate the accident by taking away ten or twelve ounces of blood from the arm, and giving an opiate immediately.

There is but one object more of any confequence, which is the danger of wounding the rectum; and this I confefs is a very troublefome accident: but if the operator obferves the rule I have laid down with regard to that article, I fhould hope it might always be avoided.

In this defcription, I believe I have been fo far from difguifing the inconveniencies of the lateral operation, that before I fpeak of its advantages I fhould once again repeat, that thefe effufions of blood are but very rare, and feldom or never mortal, when properly managed; of which the world needs no better proof than the late extraordinary fuccefs we have cut with in our hofpitals, which I believe has never been equalled in any time or country.

In this method the remarkable parts wounded by the knife are, the mufculus tranfverfalis penis, levator ani, and proftate gland: in the old way, the urethra only is wounded, about two inches on this fide the proftate, and the inftruments are forced through the reft of the paffage, which is compofed of the bulbous part of the urethra, the membranous part of the urethra, the neck of the bladder, and proftate gland. This channel is fo very narrow, that till it be torn to pieces, the management of the forceps is exceedingly difficult, and it happens frequently that from the tender texture of the membranous parts, the forceps are unwarily puffhed through it between the os pubis and bladder; befides, that in introducing the gorget upon the ftaff, it is apt to flip downwards, between the rectum and bladder, both which inconveniencies are avoided in the lateral operation. It is true, the wound made in the lateral method will not admit of the extraction of a large ftone without laceration, as well as in the old way; but in the one cafe, the laceration is fmall, and made after a preparation for

for it by an incision, and in the other, all the parts I have mentioned are torn without any previous opening, and which are so very tight, that the pain of the distension must necessarily be excessive. It is pity the operators do not in the old way always slide the knife along the groove of the staff, till they have quite wounded through the length of the prostate, since they are convinced, that by the extraction of the stone, it is opened in a ruder and more dangerous manner than by incision, and without any advantages from it; because this opening is made by the finishing of the operation; whereas, for want of it before the extraction, we can hardly widen the forceps enough to receive a large stone; and when we do, the resistance is so very great, as often to break it, notwithstanding all our care. However, in both these operations, the surgeon must not grasp the stone with violence, and even in extracting, must, with both hands to the branches of his forceps, resist their shutting so tight as the compression from the lips of such a narrow wound would otherwise make them: here I speak of the difficulty of laying hold of a stone in any part of the bladder; but if it happens to lie in one of the sinuses before mentioned, the forceps are so confined that it becomes still harder. The extraction of very large stones, is much more impracticable with the greater apparatus, than by this method, because of the smallness of the angle of the bones in that part where the wound is made; so that indeed it is necessary in almost all extractions to pull the stone downwards towards the rectum, which cannot be done without great violence to the membranous parts, and even the separation of one from another; whence follow abscesses and sloughs about the wound, which is a circumstance not known in the lateral operation. Ecchymoses followed by suppuration and gangrene, sometimes spread themselves upon the scrotum, and in short, all the inconveniencies and ill symptoms which attend upon the lateral operation, except the hæmorrhage, are in a more violent degree incident to the old way.

An incontinence of urine is not common after the lateral operation, and a fistula seldom or never the consequence of it; but the prevention of a fistula seems to depend very much upon the skill of dressing the wound afterwards; and perhaps it would not so often happen, if the dressing were rightly managed in the old way; though certainly this method is much more liable to them, as the wound is made among membranes, is more contused, and in many, from an incontinence of urine, is continually kept open. I have seen some instances, indeed, in the lateral operation, where, through neglect, the bladder has remained fistulous; but the wound being in a fleshy part, I have, without great difficulty, got little granulations to shoot up, and healed it externally; so that at present I think a fistula can hardly be accounted one of the inconveniencies of cutting for the stone in the lateral way.

The manner of treating the patient after the operation, is pretty nearly this: if it happens that the vessels of the prostate bleed, dry lint, or lint dipped in some styptic water, such as aqua vitrioli, must be applied to the part, and held there with a considerable degree of pressure for a few minutes; or, as I have before mentioned, a silver canula of three or four inches long, covered with fine rag, may be introduced into the bladder, and left there two or three days, which seldom fails to stop the hæmorrhage. The patient may also take an opiate. If the wound does not bleed, a little dry lint, or a pledget of digestive, laid gently in it, is best. The place where the patient lies should be moderately cool, as heat not only disposes the vessels to bleed afresh, but generally makes him low and faint. If soon after the operation he complains of a sickness at the stomach, or

even a pain in that part of the abdomen near the bladder, it is not always a ſign of a dangerous inflammation, but frequently goes off in half an hour: to aſſiſt, however, in its removal, a fomentation put into a hog's bladder, and applied pretty warm to the part in pain, will be of great ſervice; if the pain increaſes after two or three hours, the conſequence is much to be feared; and in this caſe, bleeding and emollient clyſters, by way of fomentation to the bowels, are immediately neceſſary.

The firſt good ſymptom after the operation, is the urine coming freely away, as we then know the lips of the bladder and proſtate gland are not much inflamed; for they often grow turgid, and ſhut up the orifice in ſuch a manner as not only to prevent the iſſue of the water, but even the introduction of the finger, or female catheter, ſo that ſometimes we are forced to paſs a catheter by the penis. From this ſymptom too we learn, that the kidneys are not ſo affected by the operation as to eſcape doing their office, which, though a very rare circumſtance, may poſſibly occur. If the patient ſhould become languid, and continue without any appetite, bliſters prove beneficial, which may be applied with great ſafety, and little pain, as there is ſeldom or never any ſtrangury. About the third or fourth day a ſtool muſt be procured by a clyſter, for it ſeldom comes naturally the firſt time, and this method muſt be continued as every man's diſcretion ſhall guide him. As ſoon as the patient comes to an appetite, he ſhould be indulged in eating light food, with this caution, that he do not eat too much at a time: it ſometimes happens that a fortnight or three weeks after the operation, one or both teſticles indurate and inflame, which diſorder may generally be removed by fomentations and diſcutient applications; or if a ſuppuration enſue, which however is very ſeldom the caſe, the abſceſs is not very difficult to cure.

If during the cure the buttocks ſhould be excoriated by the urine, let them be anointed with nutritum; the dreſſing from firſt to laſt, is ſeldom any other than a ſoft digeſtive, or dry lint; for the whole art of healing the wound conſiſts in the force with which the doſſil is applied; if it be crammed in hard, it becomes a tent, and prevents the growth of the little tender ſhoots of fleſh, till in proceſs of time, from the continual diſtenſion, and long drain of the urine, the whole cavity becomes callous, and forms itſelf into a fiſtula: on the other hand, if the wound be dreſſed quite ſuperficially, the external parts of it being more prone to heal and contract than the internal, the conſequence will be a degree of obſtruction to the urine and matter, which lying about the wound of the bladder, for want of a diſcharge, will indurate the part, and likewiſe occaſion a fiſtula. This method of dreſſing is not peculiar to wounds after cutting for the ſtone, but is applicable to fiſtulas in ano, and almoſt all abſceſſes whatſoever; ſo that the branch of ſurgery, which regards the treatment of hollow wounds, depends much more on the proper obſervance of this rule, than the application of particular medicines.

CHAP. XXII.

OF THE STONE IN THE URETHRA.

IF a ſmall ſtone be lodged in the urethra near the glands, it may often be puſhed out with the fingers, or picked away with ſome inſtrument; but if it ſtops in any other part of the channel, it may be cut upon without an inconvenience: the beſt way of doing it, is to pull the prepuce over the glans, as far as you can, and then making an inciſion the length of the ſtone, through the teguments, it may be turned out with a little hook, or the point of a probe: the wound of the ſkin ſlipping back afterward

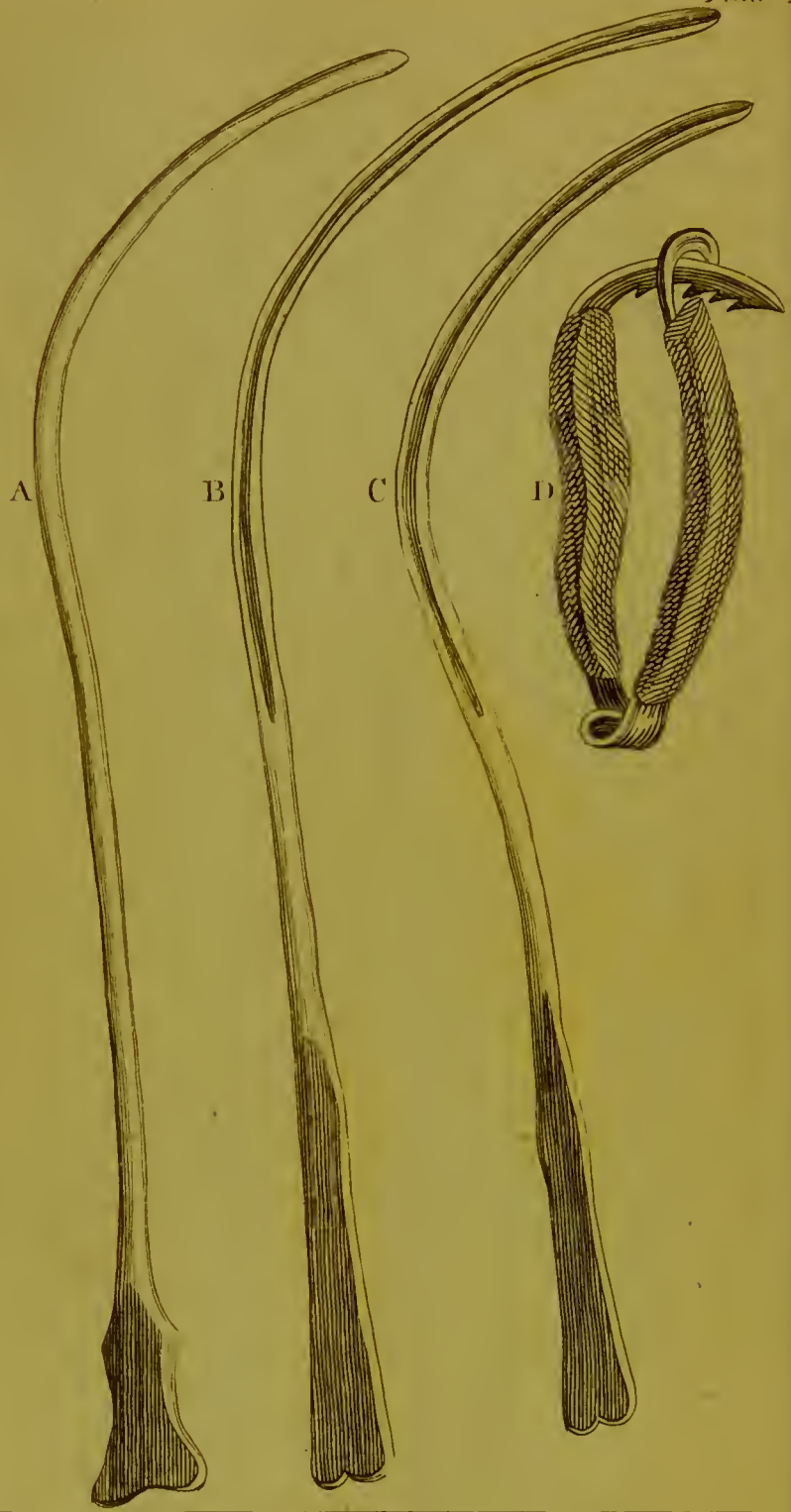

A
B
C
D

Plate 5.

afterward to its proper ſituation, and from the orifice of the urethra, prevents the iſſue of the urine through that orifice, and very often heals in twenty-four hours. This is a much leſs painful method of extracting ſtones from the urethra, than by any inſtruments that have hitherto been deviſed.

CHAP. XXIII.

OF THE EXTRACTION OF THE STONE IN WOMEN.

THE extraction of the ſtone in women, will be eaſily underſtood, ſince the whole operation conſiſts in the placing them in the ſame manner as men, and without making any wound, introducing into the bladder a ſtraight director, upon that a gorget, and afterwards the forceps to take hold of the ſtone; all which may be done without difficulty, by reaſon of the ſhortneſs of the urethra. If the ſtone proves very large, and in extracting draws the bladder forwards, it is adviſeable to make an inciſion through the neck of it, upon the ſtone, which not only will facilitate the extraction, but alſo be leſs dangerous than a laceration, which would neceſſarily follow. The dreſſings are fomentations and emolient ointments, which ſhould be applied two or three times a-day, and the patient in other reſpects be treated like men who have undergone the operation for the ſtone.

PLATE IV.

THE EXPLANATION.

A. A ſound uſed in ſearching for the ſtone.

The ſize repreſented here, is but little too large for the youngeſt children, and may be uſed upon boys when they are thirteen or fourteen years of age; a larger ſhould be employed between that age and adultneſs, when one of about ten inches, in a right line from the handle to the extremity, is proper. This ſhould be made of ſteel, and its extremity be round and ſmooth.

B. A ſtaff fit for the operation on boys from eight to fourteen years of age. The ſtaff for a man muſt be of the ſize of the ſound I have already deſcribed.

C. A ſtaff ſomething too big for the ſmalleſt children, but may be uſed upon boys from about four years of age to eight.

The ſtaff has a groove on its convex ſide, which firſt ſerves as a direction where to cut, and afterwards receiving the beak of the gorget, guides it readily into the bladder. Care ſhould be taken in making the groove, that the edges of it be ſmoothed down, ſo that they cannot wound in paſſing through the urethra. The extremity ſhould alſo be open, otherwiſe it will be ſometimes difficult to withdraw the ſtaff, when the gorget is introduced, and preſſes againſt the end of it.

Theſe inſtruments are uſually made with a greater bending than I have here repreſented; but I think this ſhape more like that of the urethra, and rather more advantageous for making the inciſion.

D. The yoke, an inſtrument to be worn by men with an incontinence of urine: it is made with iron, but for uſe muſt be covered with velvet: it moves upon a joint at one end, and is faſtened at the other by catches, at different diſtances placed on a ſpring, as will be eaſily underſtood by the annexed print. It muſt be accommodated to the ſize of the penis, and be taken off whenever the patient finds an inclination to make water. This inſtrument is exceedingly uſeful, becauſe it always anſwers the purpoſe, and ſeldom galls the part after a few days wearing.

PLATE V.

THE EXPLANATION.

A. A ſmall catheter made of ſilver. This inſtrument is hollow, and ſerves

to draw off the urine when under a ſuppreſſion; it is alſo uſed in the high operation to fill the bladder with water; near its extremity are two orifices, through which the water paſſes into its cavity. Care ſhould be taken that the edges of theſe orifices are quite ſmooth.

B. The knife uſed in cutting for the ſtone. It is the ſame I have already deſcribed; but I thought it might not be improper to repeat the figure with the alteration of a quantity of tow twiſted round it, which makes it eaſier to hold when we perform the lateral operation, and turn the edge upwards to wound the proſtate gland.

C. A female catheter, different from the male catheter, it being almoſt ſtraight, and ſomething larger.

D. A ſilver wire to paſs into either catheter, for removing any grumous blood or matter that clogs them up.

PLATE VI.

THE EXPLANATION.

A. The gorget uſed upon men in the lateral operation.

B. The gorget uſed upon children under five years of age, in the lateral operation.

A gorget between the ſizes of theſe two, will be fit for boys from five years of age to fifteen or ſixteen.

Theſe inſtruments are hollow for the paſſage of the forceps into the bladder, and their handles lie ſlanting, that they may the more readily be carried through the wound of the proſtate, which is made obliquely on the left ſide of it. The beak at the extremity of the gorget, muſt be ſmaller than the groove of the ſtaff which is cut upon, becauſe it is to be received in the groove. Care ſhould be taken that the edges of the gorget near the beak are not ſharp, leſt, inſtead of dilating the wound, as it ought, it ſhould only cut on each ſid when introduced; in which caſe, it would be difficult to carry the forceps into the bladder.

C. A gorget, with its handle exactly in the middle; this ſhaped inſtrument is uſed in the old way. All the gorgets ſhould be made of ſteel.

PLATE VII.

THE EXPLANATION.

A. The forceps for extracting the ſtone. Theſe are repreſented a little open, that the teeth may be better ſeen within-ſide.

This inſtrument muſt be of different ſizes for different ages and ſtones, from the length of that in the copper-plate, to one of near a foot long; but the forceps of about eight inches long will be found moſt generally uſeful. The number neceſſary to be furniſhed with, will be four or five.

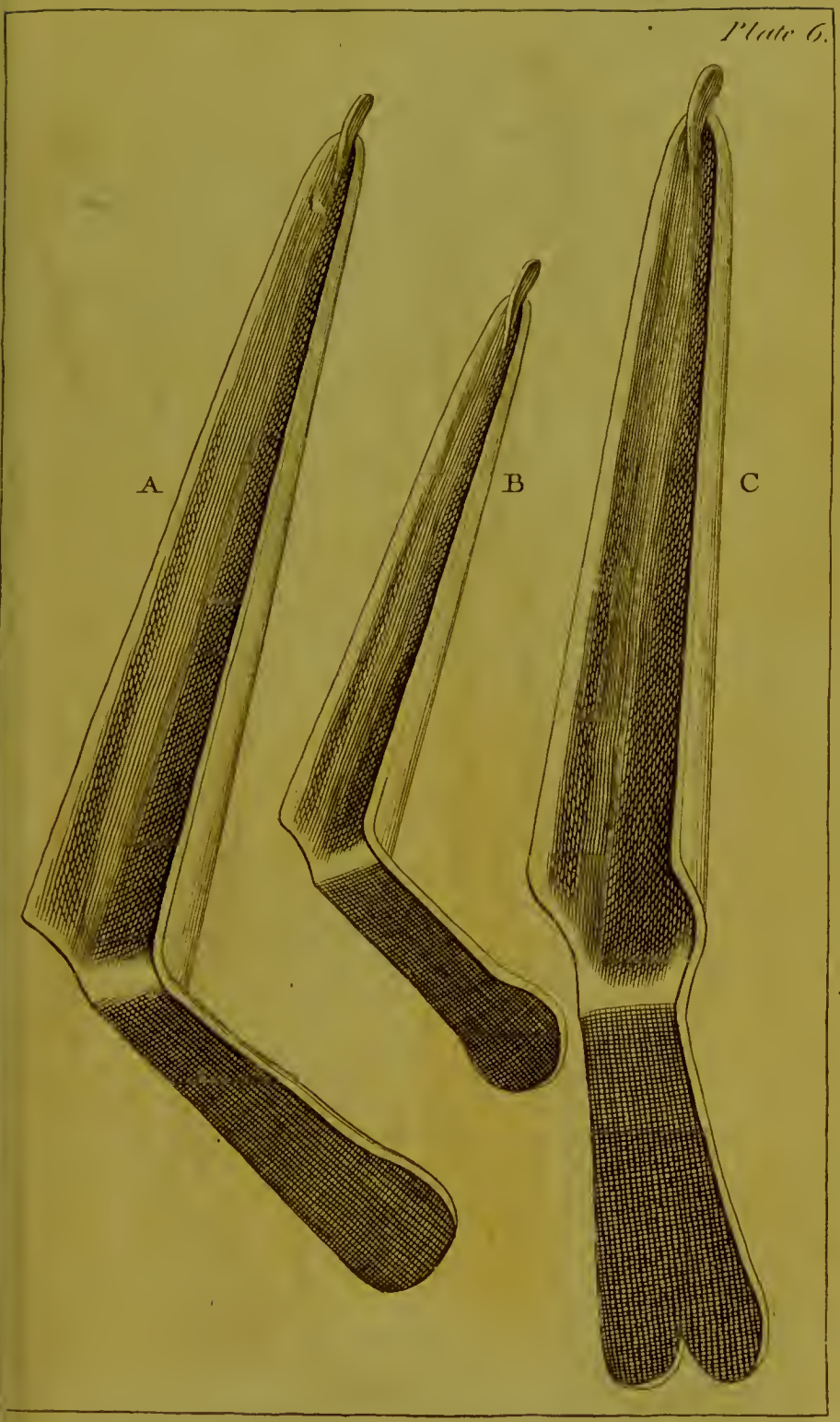
Great care ſhould be taken by the makers of this inſtrument, that it move eaſily upon the rivet, that the extremity of the chops do not meet when they are ſhut, and particularly that the teeth be not too large, leſt in entering deep into the ſtone they ſhould break it: it is of conſequence alſo that the teeth do not reach farther towards the joint than I have here repreſented, becauſe a ſmall ſtone, when received into that part, being held faſt there, would dilate the forceps exceſſively, and make the extraction difficult; on which account, the inſide of the blades near the joint ſhould be ſmooth, that the ſtone may ſlip towards the teeth.

B. A director made of ſteel, uſed for the direction of the gorget, in the extraction of the ſtone from women.

C. A ſcoop to take away the ſtone when it is broken into ſmall pieces like ſand. This inſtrument is made of ſteel.

CHAP

Plate 6.



C
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CHAP. XXIV.

OF THE EMPYEMA.

THE operation for the empyema generally implies an artificial opening made into the cavity of the thorax, by which we evacuate any fluid that lies there extravasated, and is become dangerous by its weight and quantity. The fluids described as necessary to be voided by this operation, are blood, matter, and water.

When blood is the fluid supposed to require evacuation by this method, it is always extravasated through some wound of the vessels of the lungs or thorax, and being discharged in great quantities on the diaphragm, it is said to oppress respiration till let out by some convenient opening, made in the most depending part of that cavity, which is the only kind of perforation into the thorax distinguished by the name of the operation for the empyema: But though this opening is universally recommended in the case here stated, yet we meet with few or no examples where it has been practised for a mere extravasation of blood; and I should think it can hardly ever be advisable on this account: for if we perform it immediately after the accident, and during the hæmorrhage, the opening made at the bottom of the thorax might probably make way for a dangerous effusion of blood, which perhaps would otherwise be choaked up and stopped for want of a ready issue: and if we wait till the hæmorrhage ceases, it becomes needless, because the blood not only for the most part finds some vent by the external wound, if left open, but is constantly spit up the trachea; so that had we no farther proofs of this absorbent power in the lungs, we might from hence be persuaded of the probability of its being more safely carried off so, than by any artificial opening we can possibly contrive in the thorax.

Or if it be thought that the extravasated blood, being coagulated in the thorax, cannot be taken up by the vessels of the lungs, yet even in that case, the operation usually practised will not answer the purpose; for besides the possibility of the lungs adhering to the pleura in the place of incision, which would absolutely prevent any advantage from it, the depth and narrowness of the orifice, and its height above the diaphragm, on which the congealed blood is supposed to lie, will make the success at best but very precarious.

To empty the thorax, in a rupture of any vessels which open into it, bleeding is very necessary, which not only stops the hæmorrhage, by abating the force of the circulation, but likewise, by unloading the vessels of their contents, makes them more fit to receive the extravasated fluid by absorption; gentle evacuations and pectorals, are also very serviceable, and a low diet is absolutely necessary.

The rules laid down in some books for distinguishing if a wound penetrates, have led practitioners into mischievous methods, by advising them to examine these wounds with the probe, or for more certainty the finger; which, if rudely used, sometimes even tear into the thorax, always force or press the parts too much, and often separate the lungs from the pleura, when they happen to adhere; all which violences will produce abscesses there, especially if the part be afterwards dressed with large tents, or filled with any active injection, both which were formerly applied with a view to deterge the cavity of the wound, but now seem to be exploded in favour of more superficial dressings, the advantages of which method, in my opinion, cannot be too much inculcated.

But what I have here advanced concerning the excellence of superficial application, without dilating the wound to make way for the issue of the blood or succeeding matter, must be considered with regard to punctures or incisions by sharp instruments,

ments, not followed with a great discharge; for where the wound is made with fire-arms, the method of practice must be sometimes altered; because not only sloughs and great suppurations ensue, but very often pieces of the shirt or coat are carried in with the bullet, which will perhaps require an enlargement of the wound, in order to be freely discharged; though even upon this account, there will be no occasion to make an opening at the bottom of the thorax, since the more dilatation of the wound will more readily give vent to the pus and extraneous bodies, than an orifice made lower; because the lungs being inflamed by the wound, will generally adhere to the pleura, and break off the communication between the abscess and the cavity below it. In dressing the dilated wound, care must be taken to apply the dossils with such pressure only, as shall be sufficient to keep open the external orifice; and not to crowd them into the thorax, so as to lock up that matter, which the very design of dilation is to give a discharge to.

The second circumstance in which this operation takes place, is a rupture of matter from the pleura, mediastinum, or lungs, into the cavity of the thorax, where accumulating, it at length proves fatal for want of a discharge. It is true that the case occurs but very seldom, where the operation is necessary; because in most abscesses of the thorax, the matter is spit up as fast as it is generated, and in the dissection of such who have died of this species of consumption, we rarely find much extravasated pus in the cavity, though a great portion of the lungs be destroyed: however, as I have intimated, there are a few examples which require the operation, and they may be distinguished by the following symptoms: the patient is obliged to lie upon the diseased side, or in case there is matter in both cavities of the thorax, on his back; because the mediastinum can seldom support the weight of the incumbent fluid, without suffering great pain: but this rule is not certain; it sometimes happening that the patient can lie with ease on that side where there is no fluid. Another symptom of extravasated matter, is an evident undulation of it, so that in certain motions it may be heard to quash. For the most part too, upon careful enquiry, an œdema, or at least a thickening of some portion of the intercostal muscles, will be discovered. And lastly, if there be much fluid, it will be attended with a preternatural expansion of that side of the chest where it lies. When, therefore, these signs appear after a previous pleuritic or pulmonary disorder, and the case has been attended with the symptoms of a suppuration, it is most probably owing to a collection of matter; though the patient will also labour under a continual low fever, and a particular anxiety from the load of fluid.

I have here described the abscess as breaking into the cavity of the thorax; but generally speaking, in an inflammation of the pleura or lungs, an adhesion of both ensues; in consequence of which, nature finds a discharge outwardly, it being most frequent for abscesses of the pleura and intercostal muscles, and not uncommon even for abscesses of the lungs, to break externally. In case of an adhesion, no farther operation is required than opening the tumour, when suppurated, with a lancet; and if the discharge be so great as to forbid the healing the external ulcer, it may be kept open with a hollow tent; by which manner of treatment many have lived a long time with a running fistula.

The last sort of fluid said to require issue from this operation, is water, which however very seldom collects in such a manner as to become the proper subject of the operation; for if the dropsy of the thorax be complicated with an anasarca, or even ascites, it is certainly improper, and indeed it can hardly ever take place but where the distemper is single, and takes

takes its rise from the same sort of disorder in the lymphatics of the pleura, as the hydrocele does from those of the tunica vaginalis. The symptoms of this dropsy are, a small cough without spitting, a little slow fever from the disturbance of respiration; sometimes too the water by a sudden jerk may be heard to quash, and generally speaking, its weight upon the diaphragm and mediastinum are so troublesome as to oblige the patient to stoop forward when in an erect posture, and to turn upon the affected side when he lies down; for the same reason, when there is water in both cavities of the thorax, he is forced to lie on his back.

The manner of operating, whether it be for the discharge of matter or water, is to pitch upon the most depending part of the thorax, which some have supposed to be between the eighth and ninth rib, and others between the ninth and tenth, at such a distance from the vertebræ that the depth of the flesh may not be an impediment to the perforation; this distance is determined to be about a hand's breadth; and here, with a knife, scissars, or trocar, we are ordered to make the perforation; but in doing it, there are a great many difficulties: in fat persons, it is not easy to count the ribs, and the wound will be very deep, and troublesome to make: it is hardly possible to escape wounding the intercostal artery, which runs in this place between the ribs; or if you avoid it by cutting close to one of the ribs, a caries of the bone will follow from the pressure of the tent employed afterwards: again, the inflammation of the wound may possibly affect the diaphragm, which is supposed almost contiguous to it, and this may prove of very ill consequence; so that, upon the whole, without any farther recital of objections to the empyema thus performed, it cannot appear an advisable operation. But if the only advantage proposed by this situation of the wound be derived from its dependency, the purpose of discharging the fluid will be as well answered, by an opening between the sixth and seventh rib, half way from the sternum towards the spine; which, by laying ourselves down, becomes in effect as depending an orifice as the other in sitting up; and by an opening made in this manner, we avoid all the inconveniencies in the other method: for in this part of the thorax, there is very little depth of muscles; the artery lies concealed under the rib; and the diaphragm is at a great distance; so that none of those mischiefs can ensue I have supposed in the other method; which consequently will give it the preference. The opening is best made with a knife, and should be about an inch long through the skin, and half an inch through the subjacent muscles: though, to make the incision with less risk of wounding the lungs, it may be advisable to dilate it with the blunt-pointed knife (as is practised in the operation for the bubonocele) after having made a small puncture with a common knife. If it should be objected, that the fluid cannot be discharged by this orifice while we are erect, whereas, by making it in the lower part of the thorax, it will be continually draining; I think it may be answered, that after it is once emptied, it will hardly in twelve hours be generated in greater quantity than what will lie upon the diaphragm below the opening made even by that operation, and consequently cannot be more readily discharged by one orifice than the other. The treatment of the wound will be according to the nature of the discharge. If after a few days there appears no drain, you may let the orifice heal up; but if it continues, it may be kept open with a short silver canula, till such time as an alteration in that circumstance will give us leave to cicatrize with safety.

CHAP.

CHAP. XXV.

OF ENCYSTED TUMOURS.

THESE tumours borrow their names from a cyſt, or bag, in which they are contained; and are farther diſtinguiſhed by the nature of their contents: if the matter forming them reſembles milk curds, the tumour is called *Atheroma*; if it be like honey, *Meliceris*; and if compoſed of fat, or a ſuetty ſubſtance, *Steatoma*. The two firſt are not readily diſtinguiſhed from one another, but their difference from the ſteatoma is eaſily learnt by their ſoftneſs and fluctuation. Theſe tumours appear in every part of the body, and in places where there are no glands; which, with the circumſtances of their compoſition continuing always the ſame from their firſt formation, agrees but little with an opinion ſome of the moderns are ſo fond of, that this kind of ſwelling is an obſtructed gland; whoſe membrane forms the cyſt, and whoſe fluids, when they burſt out of their veſſels after a long obſtruction, make the matter contained.

The ſteatoma is never painful till by its weight it grows troubleſome, nor is it a mark of general indiſpoſition of body; ſo that the extirpation ſeldom fails of ſucceſs. The ſize of ſome of them is very large, frequently weighing five or ſix pounds, and there have been inſtances of their weighing above forty.

When the ſteatoma is irregular in its ſurface, with eminences and depreſſions, it is ſuetty; whereas the fat one has for the moſt part a uniform ſmooth outſide. The operation for a ſteatoma will be underſtood by the deſcription of that for the ſchirrhus.

The atheroma is much more common than the meliceris, at leaſt, if all encyſted tumours with matter not curdled, may, in compliance with cuſtom, be called ſo:—theſe are more frequent, and grow larger than thoſe where the matter is curdled, being often attendant on ſcrophulous indiſpoſitions, which makes them more difficult of cure.

The cyſts of theſe tumours, with the ſkin covering them, after a certain period of growth, reſiſting any farther enlargement, do frequently inflame and break; but this opening is not ſo advantageous to the cure, as extirpation by the knife, which ſhould be done in the infancy of the ſwelling. When the tumours are no bigger than a ſmall golden pippin, they may be diſſected away from under the ſkin, by making a ſtraight inciſion only through it; but if they exceed this bulk, an oval piece of ſkin muſt be cut through firſt, to make room for the management of the knife, and taking away the tumour; in which caſe, it will be adviſeable to take off the upper portion of the cyſt with the ſkin; and then by the help of a hook to diſſect away as much of the remainder of it as can be conveniently, which is a leſs painful, and more ſecure method than deſtroying it afterwards with eſcharotics. This rule is to be obſerved, when the cyſt runs ſo deep amongſt the interſtices of the muſcles as to make it impoſſible to remove the whole of it, where, if we cut off a great quantity, the reſt uſually comes away in ſloughs and matter. I once opened a remarkable atheroma of this kind; it was about as big as the crown of a man's hat, and lay underneath the pectoral muſcle (as all I ever met with on the breaſt have done) extending itſelf towards the arm-pit, amongſt the great veſſels, and preſſing againſt the clavicle: I cut away a large circular piece of the ſkin, pectoral muſcle, and cyſt, but did not dare to touch the lower part of it, which I could not remove without laying the ribs bare; however it ſeparated in the digeſtion of the wound, which for ſome time diſcharged exceſſively, and the whole cavity filled up, leaving him the uſe of his arm almoſt perfect: after this, two or three ſmall ſplinters of the clavicle worked away through the ſkin, but without any great inconvenience.

The

The ganglion of the tendon is an encyſted tumour of the meliceris kind, but its fluid is generally like the white of an egg; when it is ſmall, it ſometimes diſperſes of itſelf; preſſure and ſudden blows do alſo remove it, but for the moſt part it continues, unleſs it be extirpated: it is no uncommon caſe to meet with this ſpecies of ganglion running under the ligamentum carpale, and extending itſelf both up the wriſt and down to the palm of the hand. The cure of this diſorder cannot be effected but by inciſion through its whole length, and dividing the ligamentum carpale, which I have performed ſucceſsfully ſeveral times.

The dreſſing in theſe caſes does not at all differ from the general methods of treating wounds.

CHAP. XXVI.

OF THE AMPUTATION OF THE CANCERED AND SCHIRRHOUS BREAST.

THE ſucceſs of this operation is exceedingly precarious, from the great diſpoſition there is in the conſtitution, after an amputation, to form a new cancer in the wound, or ſome other part of the body. When a ſchirrhus has admitted of a long delay before the operation, the patient ſeems to have a better proſpect of cure without danger of a relapſe, than when it has increaſed very faſt, and with acute pain. I cannot, however, be quite poſitive in this judgment, but upon looking round among thoſe I know who have recovered, and the obſervation, ſo far, well grounded. There are ſome ſurgeons ſo diſheartened by the ill ſucceſs of this operation, that they decry it in every caſe, and even recommend certain death to their patients, rather than a trial, upon the ſuppoſition it never relieves; but the inſtances, where life and health have been preſerved by it, are ſufficiently numerous to warrant the recommendation of it.

The ſcirrhus may be diſtinguiſhed by its want of inflammation in the ſkin, its ſmoothneſs and ſlippineſs deep in the breaſt, and generally by its pricking pain, which, as it is more or leſs, increaſes the danger accordingly; though there are ſome few with little or none in the beginning.

As the tumour degenerates into a cancer (which is the worſt degree of ſcirrhus) it becomes unequal and livid, and, the veſſels growing varicous, at laſt ulcerates.

In extirpating the ſcirrhus, if it be ſmall, a longitudinal inciſion will dilate ſufficiently for the operation; but if too large to be diſſected out in that manner, an oval piece of ſkin muſt be cut through firſt, the ſize of which is to be proportioned to that of the tumour; for example, if the ſwelling is five inches long, and three broad, the oval piece of ſkin cut away muſt be nearly of the ſame length, and about an inch and a half in breadth. In taking off the whole breaſt, the ſkin may be very much preſerved, by making the wound of it a great deal leſs than the baſis of the breaſt, which muſt be carefully cleared away from the pectoral muſcle: this is not difficult to do, becauſe all theſe ſcirrhuſes being enlarged glands, are encompaſſed with their proper membranes, which make them quite diſtinct from the neighbouring parts, and eaſily ſeparable; at leaſt this is the caſe when the tumour is moveable; for ſometimes it adheres to the ſubjacent muſcle, and that muſcle to the ribs; in which circumſtance the operation is impracticable. When it is attended with knots in the arm-pit, no ſervice can be done by amputation, unleſs the knots be taken away; for there is no ſort of dependence to be laid on their ſubſiding, by the diſcharge of the wound of the breaſt: the poſſibility of extirpating theſe knots, without wounding the great veſſels, is very much queſtioned by ſurgeons; but I have often done it

when they have been loose and distinct.

The bleeding of the large arteries is to be stopped by passing the needle twice through the flesh, almost round every vessel, and tying upon it, which will necessarily include it in the ligature. In order to discover the orifice of the vessels, the wound must be cleaned with a sponge wrung out of warm water.

The scirrhous tumours which appear about the lower jaw, are, generally speaking, scrophulous disorders, that distinguish themselves almost by the circumstance of fixing on the salivary glands. These are very stubborn of cure, but not so bad as the scirrhus, since they frequently suppurate, and heal afterwards; if they impostumate again after healing, it is for want of a good bottom, which may sometimes be procured by destroying their bad surface with a caustic. Besides these, there is another species of scirrhus in the neck, that succeeds better after extirpation than either of the former kinds; this is an enlargement of the lymphatic glands, which run close up by the jugular vein, and is distinguishable from cancers of this part by its moveableness, want of pain, the laxness of the skin covering it, the small degree of pressure it makes on the œsophagus and trachea; and lastly, the good habit of body, as it seldom affects the constitution, which cancers here do very early after their first appearance. This tumour, from its situation, requires great exactness in the cutting off: the last I took away of this kind, I separated from the jugular vein near the length of an inch and a half: they sometimes extend up to the chin towards the mouth, and occasion a division of the salivary duct in operating, which proves very troublesome to heal, but when all other methods have failed, may be cured by a perforation into the mouth, through that part of the cheek where it is wounded, which, by a tent or small seton, may be made fistulous; then by properly dressing upon the outside, the oozing of the saliva that way will be prevented, and the external orifice healed without difficulty.

The treatment of all these wounds may be made with dry lint first, and afterwards as in the common incised wounds.

CHAP. XXVII.

OF THE OPERATION OF THE TREPAN.

THE operation of the trepan is the making one or more orifices through the scull, to admit an instrument for raising any pieces of bone, that by violence are beaten inwards upon the brain; or to give issue to blood or matter, lodged in any part within the cranium.

Fractures of the scull are at all times very dangerous, not in consequence of the injury done to the cranium itself, but as the brain becomes affected, either from the pressure of the fractured bone, or that of the extravasated blood and matter.—If then the symptoms excited by a fracture do sometimes follow from a mere extravasation of blood, as is the case when the cranium is not beaten inwards, it must likewise happen that a rupture of the vessels of this part without a fracture, will also occasion the same disorders: for this reason, the operation may take place, where the scull is not much offended, but only the vessels of the dura mater, the pia mater, or the brain.

The writers on this operation have described the different disorders in which it is useful, under a great variety of names; but those few general ones, which all surgeons are acquainted with, are quite sufficient for the understanding the nature of every case that can happen.

When

When the cranium is beaten inward, without any fracture, it is called a depreſſion; when very much broken, a fracture; or if broken and beaten in alſo, a fracture with depreſſion, if it is only cracked without depreſſion, though properly a fracture, it is called a fiſſure; if none of theſe diſorders appear, where there is a ſuſpicion of them, the ſymptoms are imputed to a concuſſion of the brain. Theſe are the four diſtinctions in uſe, and which fully comprehend all the others.

The depreſſion of the cranium without a fracture can but ſeldom occur, and then it happens to children whoſe bones are more pliable and ſoft than thoſe of adults: I have met with one inſtance of this myſelf in a girl of ſeven years of age: when ſhe firſt received the injury, ſhe had the complaints of an oppreſſed brain, but they ſoon went off; the blow formed a large tumour on the parietal bone, for which ſhe was put under my care ſome days after the accident; I opened immediately into it, by cutting away a circular piece of the ſcalp, and took out a great quantity of grumous blood lying underneath the periofteum; I then dreſſed the depreſſion with dry lint, and finding no complaints come on, continued the ſame method, till in about ſix weeks ſhe was perfectly cured.

In blows of the cranium, requiring the uſe of the trepan, the marks of a fracture are generally very evident, ſince the ſcalp is often lacerated ſo much as to expoſe it to our ſight: but if the wound of the ſcalp be ſo ſmall as only to admit a probe, we muſt judge then by the feel of the ſurface of the bone, uſing the caution of not miſtaking a future for a fracture, which Hippocrates confeſſes he himſelf did; though for this frank confeſſion of an error, to prevent others being miſled, he is as much recommended to poſterity as for any of his other qualities.

If there be no wound of the ſcalp, one muſt preſs about the head with your fingers, till the patient complains of ſome particular part, which in all likelihood is the place affected, and if the ſcalp there be ſeparated from the cranium, is almoſt infallibly ſo: the ſymptoms of a fracture are, a bleeding at the ears and noſe, a loſs of ſenſe, vomitings, drowſineſs, delirium, incontinence of urine and excrement; but what is moſt to be depended upon, is a depreſſion of the bone, or a roughneſs on its outſide; for all the other complaints not only happen to concuſſions, which do well without the application of a trepan, but likewiſe there are fractures not attended with any of them, or at leaſt in a ſlight degree; ſo that theſe ſymptoms alone, without examination of that part affected, are but an uncertain rule to go by.

In concuſſions without a fracture, that produce the ſymptoms here laid down, and do well afterwards, the veſſels of the brain and membranes are only inflamed and dilated: or if they are ruptured, they abſorb the extravaſated blood again; on which account, nature ſhould be aſſiſted by plentiful bleedings, clyſters, and other evacuations, and ſo in all fractures where the patient is not trepanned immediately; however, although people with concuſſions in the violent degree I have ſtated, do ſometimes recover, it is ſo very ſeldom, that there can be no pretence, when they happen, for neglecting the trepan, but not being able to learn in what part the concuſſion is. The opportunities I have had of opening ſome people who have died under this circumſtance, have ſufficiently convinced me how little is to be truſted to any other method than an opening for the diſcharge of the abſceſs, which by confinement of matter becomes very large, ſpreading over a great quantity of the brain before it kills.

Writers diſpute very much about the poſſibility of the contra fiſſure, or a fiſſure occaſioned on the part of the head oppoſite to that on which the blow is given, or where the inner table is fractured, while the outer one remains entire: but there are hiſtories

of cafes, which, if fairly ſtated, make it unqueſtionable; and this is moſt certain, that if the complaint be at a diſtance from where the blow was received, there can be no danger in ſcalping, and applying the trepan to that part where the pain is.

There are ſurgeons who ſay that the veſſels of the diploë do ſometimes, by a concuſſion, break, and that the matter making its way through the inner table of the ſcull into the brain, requires a trepan; but I believe there is no very good authority for this aſſertion.

When we are aſſured of a fracture or depreſſion, though the ſymptoms in a great meaſure go off, and notwithſtanding there are a few hiſtories in authors, where we read that patients have ſurvived without the operation, it is, in my opinion, always adviſeable to trepan as ſoon as poſſible, in order to prevent the ſpreading of the abſceſs, which ſeldom fails to follow upon the rupture of the veſſels of the brain and membranes, and for the moſt part in a few days; though there are a great many inſtances of fractures not bringing on a fatal abſceſs for a great length of time after the accident.

I once trepanned a young woman about a hundred days after ſhe received the blow; the lower part of the parietal, and upper part of the temporal bones, were fractured and depreſſed; ſhe bled at the noſe and ears when ſhe firſt received the injury, and had at times been drowſy, and in ſome little pain, till towards the ninetieth day, when the ſymptoms of a compreſſed brain came on ſtronger, and a ſmall time after ſhe put herſelf under my care; which, with the many inſtances of the ſame kind to be met with in authors, ſhew how little ſafe it is to truſt to any extravaſation or depreſſion on the brain doing well, without the aſſiſtance of the trepan.

The manner of treating a fracture of the cranium, will be according to the nature of the fracture itſelf, and the injury of the ſcalp; if the wound of the head be toren into angles, perhaps cutting off the lacerated flaps will make room for the ſaw; if the bone be broken into ſeveral pieces, the pieces may be taken away with the forceps; or if ſome of the ſcull be alſo depreſſed, the removal of the pieces will, without perforating, make way for the elevator to raiſe the depreſſed part; but if the fracture be not complicated with a wound of the ſcalp, or the wound be too ſmall to admit of the operation, which ſeldom fails to be the caſe, then the fracture muſt be laid bare, by taking away a large piece of the ſcalp. It is a faſhion with ſome ſurgeons, to make a crucial inciſion for this purpoſe, which they preſer to the other method, upon the ſuppoſition that the wound will more eaſily heal again after the operation, by turning down the flaps; and in caſe we find no fracture, which ſometimes happens after ſcalping, that by making this ſpecies of wound, an exfoliation of the bone, and tedioufneſs of cure, will be avoided. But whoever has ſeen the practice of the crucial inciſion, muſt be ſenſible of the falſe reaſoning uſed in its favour; for it ſeldom happens that we enquire for the fracture of a ſcull by ſcalping, but that the ſcalp itſelf is contuſed, which circumſtance generally bringing on a plentiful ſuppuration, and the matter lodging between the cranium and ſkin, not only prevent their immediate healing, but occaſion a caries of the bone, which is the accident meant to be ſhunned by it; and often at laſt, the lips of the wound growing callous, require cutting off, to procure a cicatrix. If then the objection be good to the crucial inciſion, when no operation is performed, it becomes of ſo much more force when we are aſſured of uſing the trepan, that I think it is indiſputably right at all times to take off the ſcalp when we lay bare the cranium with a view to the operation, which ſeldom fails to granulate with fleſh in a few days, if dreſſed only with dry lint, and rarely grows

grows carious, if not affected by a great discharge of matter from the brain, and even in that case but superficially; or if, after it is thus exposed, new flesh should not generate upon its surface, the growth of it may be quickened by boring little orifices into the substance of the bone, or raspping it with the rugine. The form of the piece taken away may be nearly circular; and to be better assured of the course of the fracture, it will be proper it should be of the whole length of it. I believe there are few will care to expose so much naked scull, but whoever knows the great advantage and the little danger of it, will not hesitate. When the scalp is removed, the periosteum must be raised, and the arteries immediately tied, which will make way for the operation to be directly performed, though the effusion of blood has been esteemed so troublesome in this part, as to have made it almost an universal practice to postpone the use of the trepan to the day after; but the apprehension is without foundation; for if two or three of the larger vessels are tied, the others may easily be stopped with a little dry lint, and the operation take place without any inconvenience, which I have always done myself, and would recommend to others, considering how urgent the nature of the distemper is, and that less than twenty-four hours is often the difference between life and death, when the brain is much pressed by a fractured bone.

Before the application of the trepan, it is to be remembered there are certain places on the scull, where it cannot be used with so much safety as on others; the whole length of the sagittal suture, down to the nose, is always mentioned as one where the perforation is dangerous, because of the spine of the os frontis, and the course of the superior longitudinal sinus under this part, which it is supposed would be necessarily wounded by the saw, and in consequence destroy the patient by the hæmorrhage; but though a perforation may, contrary to the general opinion, be made over the sinus without offending it; and even if it was wounded, the effusion of blood would not in all probability be mortal (as I have seen in two instances) yet at best it would be troublesome; and since we are not straightened in that part of the cranium for room, I think it is advisable to forbear operating in this place. The bony sinuses of the os frontis forbid the use of the trepan near the orbits of the eyes; therefore if it should be depressed near those cavities, the surgeon must be careful to perforate either above or one side of the fracture; for sawing below it, will only lead into the sinus, and answer no purpose in the design either of giving a discharge to the matter from the brain, or an opportunity to elevate the depression; nay, perhaps leave an incurable fistula, if the patient escapes with life.

The os occipitis being very uneven, both in its internal and external surface, makes trepanning there almost impracticable; besides, the great sinuses run about so much of it, as hardly to afford space to perforate without danger of wounding them; but then it is so defended from injuries by its situation and strength, that fractures do not happen to it so often as to the other bones of the cranium; and when they do, for the most part they become soon mortal, by affecting the cerebellum, which it sustains, that the operation is seldom required in this case. Indeed the upper angle of this bone lies above the cerebellum, and when fractured or depressed, is not attended with so immediate danger; but when this happens, the course of the longitudinal sinus down the middle of it, and the neighbourhood of the lateral sinuses beneath it, make it advisable to trepan at the lower part of the os parietale, or at least upon or just below the lambdoidal suture, so that the perforation of the os occipitis can hardly ever be proper.

It may be observed, I have spoken of wounds of the cerebellum as proving

ing inevitably mortal when affected by a fracture; how long a patient may continue with matter on its surface, I cannot take upon me to say, but I believe there is no instance of a cure after an abscess; and as for wounds of it, they are generally almost instantaneous death; whereas sometimes great portions of the cerebrum have been carried off or destroyed without any notable inconvenience. From this great difference of danger, in affections of the cerebrum and cerebellum, has arisen the opinion, that the first is the organ of animal motion only, and the other of vital.

The places then unfit to admit the saw, are the three I have described; that is, the sagittal suture; that part of the os frontis near the orbits of the eyes; and the os occipitis. But when a fracture happens in any other part above the ear, there is no objection to the operation. When there is only a small fissure, without any depression or motion in the bone, the trepan may be applied on the fissure itself, which will more readily give vent to the blood or matter underneath, than if made at a distance. If the fissure be large, and the bone weakened or depressed, the trepan must be applied on one side of it, but so as to make it a part of the circumference of the sawed piece; if the fracture run upwards, it will be eligible always to perforate near its bottom, because the dependency of the orifice will give better issue to the matter, though the ill-grounded apprehension of the brain falling out there, has made many eminent surgeons contradict this rule in their practice. If by making one orifice, you cannot raise all the depressed part, you must make a second and a third, and continue doing so till you have reduced the whole cranium even: there is frequently occasion to repeat it twice or thrice, and it has been done twelve times, nay oftener, with success; which I mention, to shew the little danger there is, either in sawing the scull, or exposing the dura mater and brain when the pressure is taken off. Indeed the mischief of laying the brain bare is so small, compared with a concussion of it, or an abscess from pent-up matter, that those fractures of the scull, where the bone is broken into splinters the whole extent of it, and can be taken away, much more readily do well, than a simple fissure only, where the abscess cannot discharge itself freely; for which reason, though the depressed fracture may be raised by the means of one orifice, yet if it is of a considerable length, it will be almost absolutely necessary to make one or two more openings for the convenience of discharge; since, for want of this, we see abscesses increase daily in their quantity of matter and at the end of a few weeks carry off the patient. Those that are conversant in the dissection of persons dying of this disorder, will be convinced of the force of this reasoning, since they not only constantly find pus lodged on the brain, as far as the fissure extends, but all round about it, sometimes spreading over a quarter of its surface.

In concussions of the brain without a fracture of the cranium, if the trepan be applied, and vast discharges ensue, it will be also convenient to make more perforations into the abscess and the neighbourhood of the abscess, the situation of which will be easily guessed by the direction of the stream of matter. And here it is to be observed, that abscesses which ensue from a concussion, are generally more extensive and dangerous than those which accompany a fracture with depression; for in a fracture, the yielding of the bone destroys, in a great degree, the force of the striking body, and prevents any violent commotion of the brain; so that what the brain suffers, results chiefly from the pressure of the incumbent bone, and the laceration of the vessels near the fracture; whereas, when the cranium resists the shock, all or great part of the cerebrum sustains the concussion, and is often impostumated or inflamed

inflamed almoſt in its whole dimenſion, as we find upon opening thoſe who die of this diſorder.

The manner of trepanning is this: having fixed your patient's head ſteady, either on the bolſter of a bed, or by placing him in a low chair, with the pin of your ſaw mark the center of the piece of bone to be taken out; then with the perforating trepan, make an orifice deep enough to receive the pin, which being fixed in it, will prevent the ſaw from ſlipping; and thus you are to continue ſawing, till the impreſſion made will preſerve the ſteadineſs without the pin, when it is to be taken away, for fear of its wounding the brain before the ſaw has entered through the cranium, which it would do at laſt, becauſe of its projection. In working through the bone, the teeth of the ſaw will begin to clog by that time you arrive to the diploe, wherefore a bruſh muſt be ready to clean it every now and then, and with a pointed probe you muſt clear away the duſt in the circle of the trepanned bone, obſerving, if it be deeper on one ſide than the other, to lean afterwards on that ſide where the impreſſion is leaſt, that the whole thickneſs may be ſawed through at the ſame time. To do all this with leſs interruption, it will be proper to have two ſaws of exactly the ſame diameter, that an aſſiſtant may be bruſhing one while you operate with the other. We are adviſed to ſaw boldly, till we come to the diploe, which it is ſaid will always diſtinguiſh itſelf by the bloodineſs; but however, this is not a certain mark to go by; for though, where there is a diploe, it will manifeſt itſelf by its bloodineſs, yet ſometimes the ſcull is ſo very thin as not to admit of any; in which caſe, if an operator ſhould puſh on his inſtrument in expectation of meeting with this ſubſtance, he would unwarily wound the brain.

This is not very often the caſe, but however often enough to put a man on his guard, and make him enquire whether the bone be looſe after a little ſawing, which is the only rule we go by when we have paſſed through the diploe, and may as well be attended to before coming at it, without any great loſs of time. When it is quite ſawed through, and lies looſe, it may be taken with the forceps, contrived for that uſe; and if the lower edges of the orifice, next to the dura mater, are ſplintered, they may be ſcraped ſmooth with a lenticular.

Theſe are the chief proceſſes of the operation of the trepan: the only thing remaining to be done is, with an elevator, introduced at the orifice, to raiſe the depreſſion, or broken ſplinters, if they cannot otherwiſe be laid hold of, and to draw out the grumous blood, or any other extraneous body. If the dura mater be not wounded or torn, an inciſion muſt be made through it, to give way to the blood or matter, which almoſt certainly lie underneath it, if the ſymptoms have been bad, and none has been diſcharged from between the cranium and dura mater: though it has been lately obſerved, that an abſceſs will ſometimes be formed in the ſubſtance of the brain; and therefore, if the puncture of the dura mater does not procure an evacuation of the matter, and the ſymptoms of a ſuppuration are ſtill urgent, it will be adviſeable to make a ſmall inciſion with a lancet into the brain itſelf.

I have uſed the word trepan all along for the ſake of being better underſtood; but the inſtrument I recommend is a trephine, the advantages of which, as alſo that of a cylindrical ſaw, or one nearly cylindrical, are deſcribed in the explanation of the copper-plate.

With regard to the dreſſings of theſe wounds, I think it is very certain, that as the greateſt part of the evil proceeds from the quantity and preſſure of the matter, whatever approaches towards the nature of a tent, and increaſes its quantity and preſſure by locking it up, muſt be pernicious: therefore I would exclude the uſe of all ſyndons whatever; the haſty

haſty application too, of ſpirits of wine, which is ſo commonly adviſed, cannot be proper, as they are not only unfit for inflammations in general, but alſo criſp up the veſſels of the dura mater and brain, and ſtopping the ſuppuration, ſometimes produce a gangrene. Since then, a cloſe application is inconvenient, and whatever good there may be in topical medicines, it cannot for the moſt part be communicated to the abſcefs, by reaſon of its extent beyond the orifice, the beſt remedy will be dry lint only, which muſt be laid on looſely, to give vent to the matter, and be repeated twice a-day till the diſcharge is leſſened, when once in twenty-four hours will be ſufficient to the finiſhing of the cure, which will be ſomething retarded by the exfoliations that ſometimes follow this operation. The patient afterwards may wear a plate of tin upon the ſcar, to defend it from blows, or any accidental injury.

PLATE VIII.

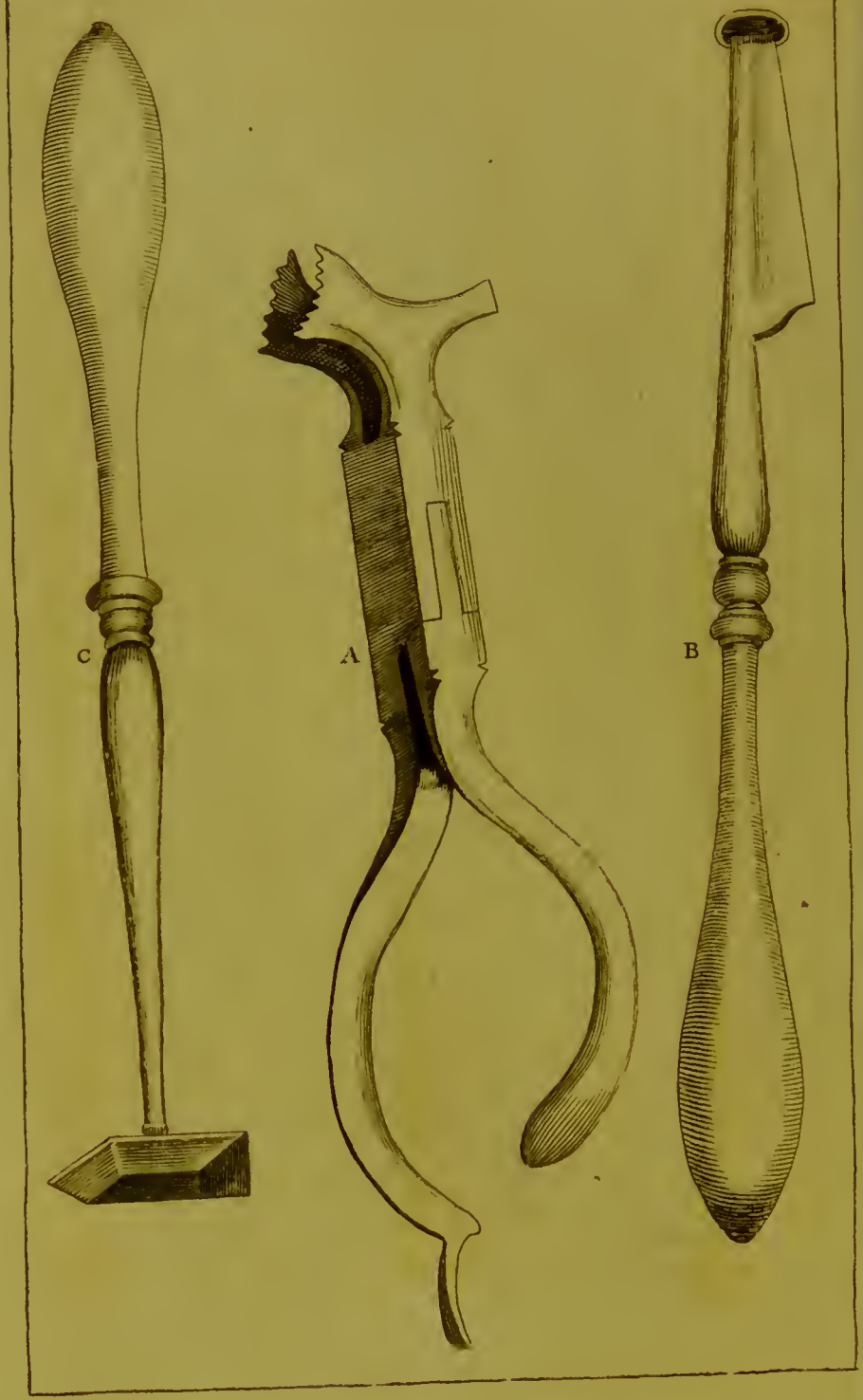
THE EXPLANATION.

A. The perforator, commonly called the perforating trepan. With this inſtrument an orifice is uſually made for the reception of the pin, on the center of the piece of bone that is to be taken away in the operation of trepanning; though if the pin be very ſharp, and project but little beyond the teeth of the ſaw, as in that marked with the letter *B*, the perforator would be needleſs; but as the point of the pin preſently grows blunt with uſe, and in that caſe it is difficult to fix the ſaw, I think it adviſeable to have this inſtrument in readineſs. It is alſo handy for boring into the ſubſtance of the bones, in order to promote a granulation of fleſh on their ſurfaces: when it is made uſe of, it muſt be received and faſtened in the handle *C*.

B. The crown, or ſaw of the trepan, with the pin appearing juſt beyond the extremities of the teeth. It may be obſerved, the ſhape of this ſaw is cylindrical, differing from thoſe in uſe which are all conical, and ſome in a very great degree. Surgeons have generally conceived great advantages to ariſe from this form; firſt, as a circumſtance of the utmoſt importance, they have imagined there would be danger of injuring the brain, by ſawing too ſuddenly through the cranium, if the enlargement of the ſaw did not increaſe the obſtruction, in proportion as they advanced towards it, and make the working of the inſtrument exceedingly ſlow. It has alſo been believed, that unleſs the ſaw was ſmaller near the teeth than towards its baſis, it would be impoſſible to incline it on any part where it had not made ſo deep an impreſſion as in others; in conſequence of which, one ſide of the circle would be ſawed through, and the membranes or brain injured; while on the other, perhaps the ſaw would not have penetrated through the firſt table of the cranium: the laſt remarkable argument in favour of the conic ſaw, is, that it more readily admits and afterwards retains the ſawed piece of bone in its cavity: but I think all the advantages attributed to this figure, are almoſt imaginary, and the great labour of working ſo ſlowly and difficultly, is not only very inconvenient to an operator, but by no means ſerviceable to the operation; for notwithſtanding the ſaw be cylindrical, and works without any other impediment than what lies before the teeth, yet even with this advantage, the operation goes on ſo gradually, that from the experience I have had, I do not find the leaſt danger of ſuddenly paſſing through to the brain, as is apprehended, if we proceed with the caution of not leaning too hard on the inſtrument when the bone is almoſt ſawed through; and with reſpect

B
C
A
E
D

Plate 9.



ſpect to the impracticableneſs of inclining it on any particular part of the circle, when ſawed uneven, which is commonly alledged; whoever will try the experiment, will in a moment diſcover the falſeneſs of the aſſertion: beſides, the very inſtance ſtated, overthrows this reaſoning, for if the circle has been already made deeper in one part than another, it muſt imply that we have leaned with more force on one part than another, and conſequently may at pleaſure do the ſame thing again: as to the laſt ſuppoſed advantage, of its receiving and retaining the ſawed piece of bone in its cavity, the benefit would be ſo frivolous, if it had truly the preference of the cylindrical one in that reſpect, that it would not be worth mentioning; but in fact, the cylindrical ſaw receives the piece of bone very readily, and often retains it in its cavity.

C. The handle of the foregoing inſtrument, called the trephine, which is much preferable to the trepan (an inſtrument like a wimble uſed by joiners) becauſe of the great convenience of holding it, and leaning on one ſide or other of the ſaw, as we find it neceſſary: the trepan, however, though allowed to be unhandy, is the inſtrument moſt uſed by ſurgeons in other parts of Europe, upon the ſuppoſition of its working quicker than the trephine.

I have repreſented the trephine of ſuch a ſhape as to make it a convenient elevator, for which purpoſe the extremities of it are made rough.

D. A Key to take out the pin *E*, when the ſaw has made an impreſſion deep enough to be worked without the help of it.

E. The pin.

PLATE IX.

THE EXPLANATION.

A. A convenient forceps to take out the circular piece of bone, when it does not ſtick to the ſaw: the contrivance by which they readily lay hold of it, is to make the extremities that are to graſp it, with an arch of the ſame circle as the ſaw is made. Upon one of the handles there is added a little elevator, to lift up any ſmall ſplinter of bone, but it is not of much uſe.

B. A lenticular; the fore part of its blade is ſharp, in order to ſcrape the lower edge of the orifice of the cranium, in caſe any ſplinters ſhould remain after the operation, and the button at its extremity receives the duſt, that it may not fall on the brain; but there is ſeldom any occaſion for this inſtrument, and I have never myſelf been under the neceſſity of uſing it.

C. A rugine, or raſpatory, which I have recommended for ſcraping bones, in order to promote granulations of fleſh. The handles of theſe two laſt inſtruments are wood, whereas every part of the others ſhould be made of ſteel.

CHAP. XXVIII.

OF THE CATARACT.

THE cataract, called by the Latins *Suffuſio*, is a diſeaſe of the cryſtalline humour, rendering the whole body of it opake, ſo that the rays of light, which, in the natural ſtate of its tranſparency, were tranſmitted to the tunica retina, become now totally intercepted, and produce no effect. This is pretty nearly the account delivered down to us by Hippocrates and the ancient Greeks, who likewiſe knew it by the name of *Glaucoma*. Galen was perhaps the firſt who ſpecified any difference in defining the cataract to be a film ſituated behind the iris; and the glaucoma, a diſorder of the cryſtalline humour; which opinion, with very little alteration, has prevailed from his time down to the latter end of the ſeventeenth century, when there aroſe a diſpute on this diſtinction of Galen's, ſome of the moderns aſſerting, with Hippocrates, that the cataract is al-

ways a diſeaſe of the cryſtalline humour; and indeed with ſo much reaſon, that there is now hardly any one who doubts it: however, during theſe laſt forty years, this ſubject has produced many arguments on both ſides.

Mathematicians having obſerved, in thoſe who have been couched, that the defect of ſight remaining after the operation, anſwers nearly to what in opties the removing the cryſtalline humour would occaſion, have endeavoured to prove, that the operation muſt in conſequence be the depreſſing that humour. and leaving the eye to perform its function afterwards with the aqueous and vitreous only; which wanting the denſity of that humour, will not refract the rays ſufficiently to re-unite them on the retina; whence patients, after their cure, are obliged to uſe convex glaſſes, as ſubſtitutes for the depreſſed cryſtalline humour.

Dr. Petit, a moſt accurate anatomiſt of Paris, has, from a critical examination of the figure of the eye, argued againſt the poſſibility of a film's exiſtence in the poſterior chamber, by reaſon of the ſmallneſs of that chamber, or proximity of the cryſtalline humour to the back of the iris; and again, from the impracticability of diſlodging ſuch a film, without offending the ſound cryſtalline humour.

Laſtly, and what is more certain, anatomiſts have frequently diſſected the eyes of perſons under this diſorder, after their death, and have found it to be always an opacity of the cryſtalline humour, agreeably to the definition of a glaucoma: ſo that by conſequence we muſt underſtand the words cataract and glaucoma, as ſynonymous terms, ſince they are, in fact, but one and the ſame diſeaſe.

I think it needleſs to ſtate the reaſons on the other ſide of the queſtion, as they are of little weight, and indeed almoſt univerſally exploded.

In deſcribing the nature of a cataract, it has hitherto been a poſitive maxim laid down by oculiſts of every nation, that there is one certain ſtage of the diſtemper, in which only the operation is proper; and this ſtate of the diſeaſe is ſaid to be the maturity of the cataract: they have compared it to the ripeneſs of fruits, and have ſuppoſed a regular change in the conſiſtence of the cryſtalline humour, from the moment it is affected. They ſay, the diſeaſe upon its firſt invaſion gradually liqueſies the humour, and that after its arrival to the utmoſt period of liquefaction, it then begins to acquire various degrees of tenacity, till at laſt it becomes perfectly hard, or, as they ſtile it, horny: that the ſkill of the ſurgeon diſcovers itſelf by fixing on that time for the operation, in which the fluidity of the cataract is no obſtacle to the depreſſion of it, from its want of reſiſtance to the needle; nor its hardneſs, from the elaſticity of it connecting fibres, which immediately return to its former poſition.

This, in a few words, is the general doctrine; but I think the regular alteration of the denſity of the cryſtalline humour, is very much to be doubted, and for my part, I cannot help poſitively excepting to the rule here laid down, having not only ſeen cataracts of twenty or thirty years growth, often upon the touch of the needle prove ſoft and milky, but alſo many inſtances, in which a due degree of conſiſtence occurred after four or five months (I may venture to ſay days) when the cataract was the conſequence of a blow or puncture; both which caſes ſo little correſpond with this ſuppoſed change, that they ſeem not only to overthrow it, but to imply that the cataract, after it has acquired its total degree of opacity, may frequently, if not generally, continue in the ſame ſtate of tenacity to the life's end; and though I will not take upon me to affirm that cataracts come always very early to their greateſt conſiſtence, yet this we may ſafely deduce from theſe obſervations, that whenever they become entirely opake, we may properly undertake the operation;

ration; which has been my method of practice hitherto, nor do I find any reaſon to lay it aſide.

I ſhall, however, obſerve in this place, that contrary to the received opinion, I have, upon examination, found cataracts of a proper conſiſtence to be couched, long before they would have been opake; ſince it might be ſucceſsful, as I have here intimated, even before that time, though I ſhould never adviſe it, nor do I believe that patients would ſubmit to it, whilſt they enjoyed a certain degree of ſight.

Since then, the glaucoma is no other diſeaſe than the cataract, we muſt at once diſcard the diſtinction of theſe two diſtempers as merely imaginary; and from what has been ſaid with regard to the conſiſtence of a cataract, that whatever it be, the removal of the humour is the ſole end of the operation, the diſtinction of a true and falſe cataract will appear equally frivolous; and conſequently moſt of the ſubdiviſions compriſed under this laſt, ſuch as the bag, the milky, the purulent, the doubtful, the membranous, the fibrous, the ſhaking, and many more, in the books of this diſeaſe, the greateſt part of which are names that puzzle the memory, without informing the underſtanding, and, indeed, have not a ſufficient foundation in nature, but owe their diverſity of character more to the imagination of writers, than any real variety in the diſeaſe.

The general criterion of the fitneſs of cataracts for the operation, is taken from their colour; the pearl-coloured, and thoſe of the colour of burniſhed iron, are eſteemed proper to endure the needle; the white are ſuppoſed milky, the green and yellow horny and incurable; the black cataract is deſcribed by moſt authors, but I dare ſay has been miſtaken for a gutta ſerena, where no diſeaſe appearing, the pupil ſeems black as in a natural ſtate of the eye: and as to the green one, I have not, as I remember in a great number of cataracts, met with a ſingle inſtance of it, but poſſibly it may be in nature; and one would indeed imagine the deſcribers of it could not be miſtaken, in what muſt have been ſo evident.

The depreſſion of a cataract of any colour, would be the cure, if that alone was the diſtemper of the eye; but it generally happens that the yellow cataracts adhere to the iris ſo firmly, as to become immoveable; beſides, when they follow in conſequence of a blow, which is often the caſe, either the cells of the vitreous humour are ſo much diſturbed and broken, or the retina affected, that a degree of blindneſs will remain, though the cataract be depreſſed, and that one cauſe removed.

To judge whether the cataract adheres to the iris, if you cannot at once diſtinguiſh it by your ſight, ſhut the patient's eye, and rub the lids a little; then ſuddenly opening it, you will perceive the pupil contract, if the cryſtalline humour does not prevent the action by its adheſion: and when this is the caſe in any kind of cataract, the operation can hardly be adviſed, though where the adheſion has been ſlight, I have now and then performed it with ſucceſs.

Another conſideration of the greateſt moment, before undertaking the cure, is to be aſſured of the right ſtate of the tunica retina, which is very readily learnt, where there is no adheſion of the cataract, from the light falling between the iris and cryſtalline humour, which if the eye is not ſenſible of, it is a certain indication of another malady, and abſolutely forbids the operation. Generally, this cataract takes its riſe from head-achs, convulſions, and nervous diſorders. How the eye perceives in this caſe, *vide* the copper-plate.

The operation for the ſoft ſpecies of cataract, which may perhaps properly be ſtiled milky, has been by ſome writers falſely ſaid never to ſucceed. Of this there are two ſorts:

ſome, where we do not perceive any membrane, but which are almoſt uniformly ſoft, and admitting the needle through them as through water, are conſequently immoveable; and others where the humour is liquefied, and contained in its own membrane, now pretty much thickened by the diſeaſe, which laſt frequently does well; for, upon breaking the membrane, the fluid burſts out and precipitates, and the membrane itſelf, if it is not depreſſed, in proceſs of time ſhrinks into a ſmall compaſs, or waſtes quite away.

Whether the whole cataract, after its ſubſiding, continues to lie at the bottom of the eye, or is quite waſted by being ſeparated from its veſſels, I have never had an opportunity of knowing poſitively by diſſecting one that had been couched; but by what we ſee of thoſe which have not been totally depreſſed below the pupil, and continue in that ſtate for ever after, we may ſuppoſe that they only waſte a little: I know one inſtance of a woman, whoſe cataract after couching became quite looſe in the eye, and in an erect poſture ſunk to the bottom, but by ſtooping the head forward, ſhe could bring it quite over the pupil. On the other hand, I once couched a perſon, when, upon the firſt attempt to depreſs the cataract, it ſuddenly ſprung up, and made its way through the pupil into the anterior chamber of the eye, where I left it, without endeavouring to diſlodge it again. In about ſix weeks it began to diminiſh, and at the end of ten weeks was entirely waſted, and the patient ſaw extremely well.

When none of the objections I have ſtated forbid the operation, it may be thus done:—having placed your patient in a convenient light, and in a chair ſuitable to the height of that you yourſelf ſit in, let a pillow or two be placed behind his back, in ſuch a manner, that the body bending forward, the head may approach near to you; then inclining the head a little backward upon the breaſt of your aſſiſtant, and covering the othe eye, ſo as to prevent its rolling, let the aſſiſtant lift up the ſuperior eyelid, and yourſelf depreſs a little the inferior one: this done, ſtrike the needle through the tunica conjunctiva, ſomething leſs than one tenth of an inch from the cornea, even with the middle of the pupil, into the poſterior chamber, and gently endeavour to depreſs the cataract with the flat ſurface of it. If, after it is diſlodged, it ariſes again, though not with much elaſticity, it muſt again and again be puſhed down. If it is membranous, after the diſcharge of the fluid, the pellicle muſt be broke and depreſſed: if it is uniformly fluid, or exceedingly elaſtic, we muſt not continue to endanger a terrible inflammation, by a vain attempt to ſucceed. If a cataract of the right eye is to be couched, and the ſurgeon cannot uſe his left hand ſo dexterouſly as his right, he may place himſelf behind the patient, and uſe his right hand.

I have not recommended the ſpeculum oculi, becauſe, upon the diſcharge of the aqueous humour through the puncture, the eye being ſomewhat emptied, more readily admits the depreſſion of the cryſtalline humour, than when preſſed upon by the inſtrument.

As to the method of treating the ſucceeding inflammation (when it happens, for ſometimes there is none) I can adviſe nothing particular, but to refrain from thoſe collyria that are charged with powders; for the thinner parts flying off, leave a gritty ſubſtance in the eye, which muſt be pernicious; bleeding, and other gentle evacuations, are found abſolutely neceſſary. The uſe of cool applications externally is moſt eaſy to the eye; but, after all, there will ſometimes enſue a troubleſome ophthalmy, which with the uncertainty there always is of ſucceſs after the operation, have deterred moſt ſurgeons from undertaking it, and, till lately, from ſtudying the nature of the diſeaſe; but I fancy the operation will come into

greater

greater repute, when more generally practiſed by men of good character; for it is leſs the difficulty than the abuſe of it by pretenders, which has brought it into diſcredit.

Since the publication of the ſixth edition of this Treatiſe, a method of removing the cataract by opening the cornea, and extracting the cryſtalline itſelf, has been diſcovered. The experience of a little more time will evince whether it be preferable or not to the old operation. For the manner of performing it, and the ſucceſs attending it, I muſt refer the reader for the preſent to the Philoſophical Tranſactions, and to the third edition of my Critical Enquiry, where I have ſaid all I yet know on this ſubject.

CHAP. XXIX.

OF CUTTING THE IRIS.

THERE are two caſes where this operation may be of ſome ſervice; one, when the cataract is, from its adheſion, immoveable; and the other, when the pupil of the eye is totally cloſed up by a diſorder of the muſcular fibres of the iris, which gradually contracting the orifice, at laſt leaves the membrane quite imperforate. This laſt diſtemper has hitherto been deemed incurable. The adheſion of the cataract I have ſpoken of in the preceding chapter, and conſidered it as a ſpecies of blindneſs not to be relieved; but Mr. Cheſelden has invented a method of making an artificial pupil, by ſlitting the iris, which may relieve in both the inſtances here ſtated.

In doing this operation, the patient muſt be placed as for couching, and the eye kept open and fixed by the ſpeculum oculi, which is abſolutely neceſſary here, for the very reaſon I would diſcard it in the other; ſince the flaccidity of the membrane from the iſſue of the aqueous humour, would take away its proper reſiſtance to the knife, and make it, inſtead of being cut through, tear from the ligamentum ciliare; then introducing the knife in the ſame part of the conjunctiva you wound in couching, inſinuate it with its blade held horizontally, and the back of it towards you, between the ligamentum ciliare and circumference of the iris, into the anterior chamber of the eye, and after it is advanced to the farther ſide of it, make your inciſion quite through the membrane; and if the operation ſucceeds, it will, upon wounding, fly open, and appear a large orifice, though not ſo wide as it becomes afterwards.

The place to be opened in the iris, will be according to the nature of the diſeaſe: if the membrane itſelf be only affected with a contraction, the middle part of it, which is the natural ſituation of the pupil, muſt be cut; but if there be a cataract, the inciſion muſt be made above or below the cataract, though I think it more eligible to do it above.

The contracted iris, from a paralytic diſorder, is ſo often complicated with an affection of the retina, that the ſucceſs is very precarious in this caſe. This operation, by what I have ſeen, has anſwered beſt in adheſions of the cryſtalline humour, though, to ſpeak truly, but very ſeldom even there. As I would not miſlead any one who ſhall practiſe an operation not yet much known in the world, I do confeſs that either the danger of the iris ſeparating from the ligamentum ciliare, or of the wound not enlarging ſufficiently, do upon the whole make the event very doubtful. I once performed it with tolerable ſucceſs, and, a few months after, the very orifice I had made, contracted, and brought on blindneſs again. Since it has been diſcovered by the extraction of the cryſtalline, that a large wound may be made through the cornea without any bad conſequence, I ſhould imagine this operation would be much improved by introducing the knife perpendicularly through the cornea and iris, and cutting both at the ſame time, ſo that the

the inciſion of the iris ſhould be exactly in the ſame part, and of the ſame dimenſions as by the other method.

In theſe two chapters I have not once uſed the word *Uvea*, but have made mention of the *Ligamentum ciliare*, two or three times; both which parts are but little underſtood for want of proper explanation; but which muſt be rightly conceived of, in order to underſtand what I have ſaid upon theſe diſeaſes.

The generality of anatomiſts call that membrane, which I have ſpoken of under the name of iris, the uvea, and its anterior lamina, the iris; others again call the membrane, uvea, and the colour of it, iris; but both one and the other diſtinction confound learners exceedingly, and take their riſe from a want of proper attention to the hiſtory of anatomy. The ancients, who have given moſt of the names we now employ in the deſcription of the eye, were verſed chiefly, if not altogether, in the diſſection of brutes, amongſt which, thoſe of the graminivorous kind have a party-coloured choroides, one half of it being dark, and the other of a light ſhining green; this laſt, from its reſemblance to an unripe grape, was called the uvea; but the ſucceeding writers amongſt the moderns, applying themſelves to human diſſections only, and not duly conſidering the difference of the human choroides, which is nearly of an uniform colour, and of that above deſcribed, have retained the appellation, though we have not the thing. Hence have ariſen the great variety of miſapplications of this word, which ought no more to be adopted in the anatomy of the human eye, than the tunica nictitans, which is proper to certain beaſts and birds.

The ligamentum ciliare is that circular line on the globe of the eye, where the ſclerotis, choroides, retina, cornea, proceſſus ciliares, and iris, terminate, forming a whitiſh ring ſomewhat denſer than any other part of the coats; but ſince the inſtitution of this term, the deſcription of the part it implies has been very much neglected, and the term itſelf confounded with the proceſſus ciliares; wherefore it was neceſſary to define it, that the proceſs of the operation of the iris might be better comprehended.

PLATE X.

THE EXPLANATION.

A. The couching-needle, the broad part of which towards the point is flat on one ſide; but on the other, is a little convex, to give it more ſubſtance and ſtrength.

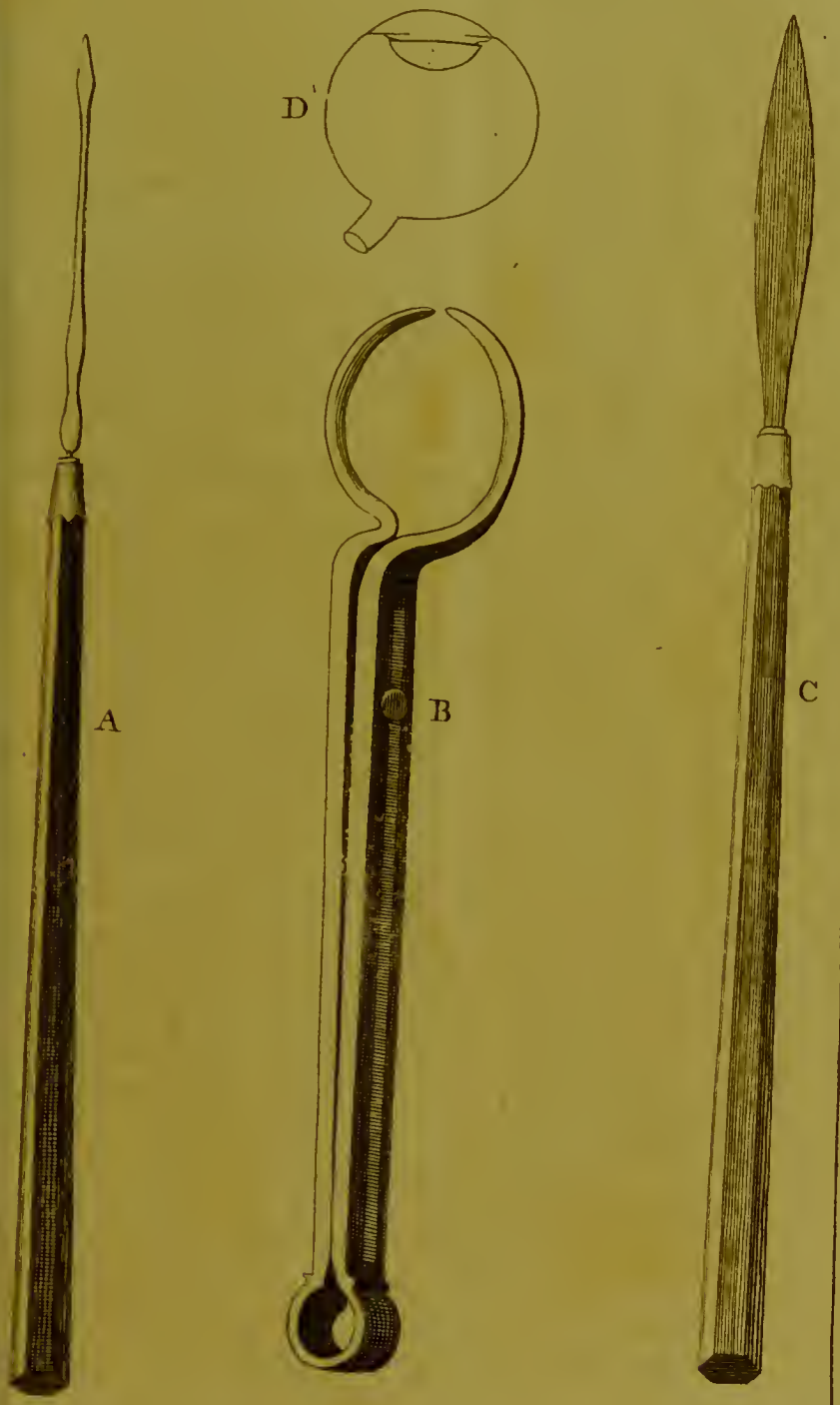
The handle of this inſtrument is white ivory, inlaid with a ſtreak of black in that part of it lying even with the convex-ſurface of the blade: the meaning of which is, that by holding the handle with the ſtreak upwards, we may be guided to depreſs the membrane of a milky cataract with the flat ſurface, though the ſubſtance of the cataract ſwimming in the eye obſcures the needle, and prevents its being directed in a proper poſition by the ſight.

B. A ſpeculum oculi, which is made to open or ſhut by an iron button ſliding along a ſlit in the handle. This inſtrument is compoſed of one piece of ſteel, in ſuch a manner that it would fly open by its elaſticity, if the two branches of the handle were not confined by the button. The circle of it ſhould be covered with velvet, to make it lie ſofter on the eyelids.

C. The knife for cutting the iris, the blade of which has two edges, reſembling a lancet, which are more advantageous than one only, in cutting the cornea for the extraction of the cataract.

D. The figure of the eye.

The ſmall arch on the fore part of the figure is the cornea, the two ſtraight lines tending to each other are the iris, and the opening between them is the pupil; the ſpace between the


D
A
B
C

the cornea and the iris, is the anterior chamber of the eye; the ſpheroidal body is the cryſtalline humour; the ſpace between the iris and cryſtalline humour, is the poſterior chamber; and the two ſhort lines which ariſe from the meeting of the cornea, iris, &c. and run upon the cryſtalline humour, are the proceſſus ciliares. The deſign of this repreſentation is to ſhew the ſmallneſs of the poſterior chamber, and how ſome light may paſs obliquely between the iris and cryſtalline humour, through the interſtices of the ciliary proceſſes, and occaſion that degree of ſight which people with cataracts have.

CHAP. XXX.

OF THE FISTULA LACHRYMALIS.

THE fiſtula lachrymalis is generally underſtood to be ſuch a diſorder of the canals leading from the eye to the noſe, as obſtructs the natural progreſs of the tears, and makes them trickle down the cheek; but this is only the firſt and mildeſt ſtage of the diſeaſe; in the next, there is a mucus reſembling matter, and afterwards matter itſelf diſcharged with the tears from the puncta lachrymalia, and ſometimes from an orifice broken through the ſkin between the noſe and angle of the eye: the laſt and worſt degree of it is, when the matter of the abſceſs, by its long continuance, has not only corroded the neighbouring ſoft parts, but alſo affected the ſubjacent bone.

For the better underſtanding the ſeat and nature of this diſtemper, I have here annexed a repreſentation of the lachrymal ducts.

In treating of the fiſtula lachrymalis, moſt writers mention the inflammation and ulceration of the ſaccus, as being ſometimes the immediate cauſes of it; but then they all ſuppoſe that the tears becoming acrid and corroſive, excite the inflammation and abſceſs; though many of them imagine that the tears themſelves, not finding a way through the naſal duct, do, from ſtagnating in the ſaccus, corrupt and become the matter diſcharged by the puncta lachrymalia; but the latter opinion is moſt certainly ill-grounded; for beſides that the tears are not of a compoſition to become pus, it may be obſerved almoſt at any time upon preſſing the abſceſs, that the two fluids appear unmixed; and with regard to the general doctrine of the ſharpneſs of the tears producing the diſorder, I think it is much to be queſtioned; ſince the cornea and tunica conjunctiva being more ſenſible membranes than the ſaccus, would more readily be offended by them; but as we ſee they are not in the leaſt injured, and every part of an animal body is ſubject to inflammation, &c. from internal cauſes, I believe this external one may be juſtly doubted.

Whatever be the cauſe of the inflammation, whether the ſmall-pox, lues venerea, &c. the effect of it is an obſtruction of the ductus ad naſum. That a total obſtruction ſhould follow upon an inflammation in ſo large a veſſel as the naſal duct, I preſume is owing to its ſituation in the bony groove of the os unguis, which not allowing it to dilate in its inflammation and thickening, muſt neceſſarily make it fill up the whole channel, and cauſe that regurgitation of tears and matter, which is the conſtant ſymptom of this diſeaſe.

Some years ſince, Monſieur Annell, a French ſurgeon, recommended, in the recent fiſtula, to paſs a ſmall probe through one of the puncta lachrymalia into the ſaccus and noſe, in order to break the concretions which were ſuppoſed to make the obſtruction, and with a ſmall pipe and ſyringe, to throw an injection through the other, in order to waſh them away. This method was at firſt received with great applauſe, and ſtill continues to be practiſed by ſome very eminent ſurgeons; yet, by what I have been able to learn from the experiments of others, and the reaſon of the thing, I am by no means inclined to think favourably

favourably of the invention; for as the very characteriſtic of this ſtate of the fiſtula, is the reflux of the tears from the ſaccus, the channels leading to it from the puncta lachrymalia muſt be ſuppoſed clear; and as to the obſtruction in the naſal duct, an injection thrown with ſo little force, can hardly be imagined ſufficient to remove it; and ſtill leſs, if it be true that the obſtruction is not owing to any looſe ſubſtance clogging up the paſſage, but to an inflammation of the membranes.

If, then, the injection cannot aſſiſt by the force of its ſtream, the advantage muſt ariſe from its balſamic qualities; but no ſurgeon at this time dilates an abſceſs of any kind by injections, when the pus is good conditioned, and he can by compreſs diminiſh the cavity of it, as may be done in this very caſe, and which ſhould be practiſed before any other method is undertaken: indeed Annel and his followers, after the injection, applied a compreſs and bandage, to the good effects of which, rather than any of the other proceſſes, I am inclined to think the ſucceſs was owing.

When the quantity of matter returned by the puncta increaſes, notwithſtanding the uſe of compreſs, and the tumour of the ſaccus grows larger, it then becomes neceſſary to perform the operation, the deſign of which is to cure the ulcer, and make way for the tears into the noſe.

The general notion that the abſceſs of the bag always occaſions a caries of the os unguis, perhaps may have led ſurgeons into the method of deſtroying both ſaccus and bone with a perforating inſtrument, and afterwards more effectually with an actual cautery, in order to remove the diſordered bone, and at the ſame time to make an artificial canal into the noſe; but as there are many inſtances of cure by a mere inciſion of the ſaccus lachrymalis, the rougher method of perforation ought not to be uſed, unleſs there is evidently a caries in the adjacent bone, or that after the ulcer of the ſaccus is healed, the tears cannot be made to paſs through the duct; though even in that caſe, the application of fire is not only generally uſeleſs, but often proves hurtful, and deſeats the very end it was intended to promote. The deſign of the cautery is, to prevent the artificial canal made by the perforation from cloſing; but the operators who recommend it, confeſs that in perſons who have been cauteriſed, even at the beſt, the tears trickle down ever after: whereas that accident does not ſo often attend on thoſe where the inciſion only is practiſed: the reaſon of this difference may perhaps be more clearly explained by a parallel inſtance: if we divide a vein quite through, and cauteriſe its extremities, it is well known that the ſloughs formed by the fire, hardly ever ſeparate from the living parts of the vein, until they are totally cloſed up ſo as to prevent any effuſion of the circulating blood; the conſequence of which is, the breaking off the communication of the divided parts of the vein; whereas, if there was only an opening made with a ſharp inſtrument, or even a piece of the vein carried away by it, the divided parts would ſoon re-unite, and the circulation be continued through them: for the ſame reaſon, by the uſe of the cautery, the communication between the puncta lachrymalia and ſaccus will often be entirely deſtroyed; and the perforation into the noſe, though it remain open, will of conſequence not anſwer the purpoſe for which it was intended.

It may perhaps be ſaid, that by introducing the cautery through a canula, the upper part of the ſaccus, or opening of the lachrymal channels, may be protected from theſe ill effects; but I believe it will plainly appear, by the rudeneſs of the ſcar after the healing of the wound, how powerfully fire will work upon the neighbouring parts, notwithſtanding this precaution.

From what has been ſaid of the nature of this diſeaſe, the uſe of fire muſt

muſt be diſcarded in all the ſtages of it, and even perforation for the moſt part be practiſed only when the ſubjacent bone is carious; but this circumſtance is very rare, and for my own part, ſince I have doubted its frequency, it has not been my fortune to meet with a ſingle inſtance of it, though I have had fiſtulas of many years ſtanding under my care, in ſome of which the pus has found iſſue through the bag and ſkin, and formed an external ulcer likewiſe. The reaſon why the inferior part of the ſaccus is not ſo often corroded as the ſuperior (in which caſe the bone would neceſſarily be affected) is, that here, as in every other part of the body, abſceſſes will break where they are leaſt under confinement, as in thoſe places they ſooner give way to the preternatural influx of the juices, and in conſequence becoming weaker, will ſooner be deſtroyed. Since, therefore, neither the long continuance of the diſeaſe, nor the great diſcharge of matter, are poſitive ſymptoms of a caries, we ought to be well ſatisfied of it by the feel of the probe, before we perforate; but if, upon opening the bag, or in the courſe of dreſſing, it appears the os unguis is bare, we are not to wait for an exfoliation, the bone being ſo very thin, but to break through with a ſmall perforator.

Many writers mention the ſucceſs of having ſometimes treated the fiſtula lachrymalis as a mere abſceſs of the ſaccus, though in general they recommend the uſe of fire; but when the abſceſs is ſo foul as not to cure by inciſion, a piece of the bag itſelf muſt be cut away; and thus Celſus treated the fiſtula lachrymalis (though he alſo uſed the cautery) without perforating.

The manner of operating in thoſe caſes where perforation is not required, is this: ſuppoſing the abſceſs not broken, chooſe a time when it is moſt turgid with matter; and to this end, you may ſhut the patient's eye the day before, and lay little ſlips of plaſter upon one another acroſs the lids, from about the puncta lachrymalia to the internal angle; which compreſſing their channels, and preventing the flux of the matter that way, will heap it up in the bag, and indicate more certainly the place to be cut. If the abſceſs is already open, the orifice and probe will inform you where to enlarge; then placing the patient in a ſeat of convenient height for the management of your hand; with a ſmall inciſion-knife dilate from the upper part of the bag, down to the edge of the orbit, without any regard to the tendon of the orbicularis muſcle, or fear of wounding the blood-veſſels; though if you ſee the veſſels, it is proper to ſhun them: the length of this inciſion will be near four-tenths of an inch. It has been adviſed in opening the bag, to introduce a ſmall probe through one of the puncta into its cavity, to prevent wounding the poſterior part of it; but I think this exceſs of care may be more troubleſome than uſeful; ſince, in ſo large a veſſel, a very ſmall ſhare of dexterity is ſufficient to avoid the miſtake. In making this inciſion, care muſt be had not to cut too near the joining of the eye-lids, becauſe of the deformity of the ſucceeding ſcar: though the blear-eye, or uneven contraction of the ſkin in that part, after the operation, is generally owing to the uſe of the cautery, and not to the wound of the tendon of the orbicularis muſcle; for this laſt is neceſſarily, from its ſituation, always cut through, but without any inconvenience, becauſe of the firm cicatrix afterwards that fixes it ſtrongly to the bone.

When the bag is open, it is to be filled with dry lint, which the next day may be removed, and exchanged for a doſſil dipped in a ſoft digeſtive medicine; this muſt be repeated every day once or twice, according to the quantity of the diſcharge; now and then, when the matter is not good, uſing the precipitate medicine, and from time to time a ſponge-tent, to prevent the too ſudden re-union of the upper part of the abſceſs. When

the diſcharge begins to leſſen, it will be proper to paſs a ſmall probe, a ſmall bougie, or ſilver wire, through the naſal duct into the noſe, every time it is dreſſed, in order to dilate it a little, and make way for the tears and matter, which, by their drain, will continue to keep it open. This method muſt be followed till the diſcharge is nearly over (which will be in a few weeks) and then dreſſing ſuperficially with dry lint, or any drying application, the wound will ſeldom fail of healing.—After the cure, in order to prevent a relapſe, it will be proper, for a few weeks, to wear the compreſſing inſtrument repreſented in the copper-plate.

When the bone is bare, and the fiſtula requires perforation, the perforator is not to be carried down the ductus ad naſum, for fear of boring into the ſinus maxillaris; but more internally towards the noſe, which will bleed freely, if properly wounded: the wound afterwards ſhould be dreſſed with doſſils, in the manner above deſcribed, and the probe or ſilver wire be every day paſſed through the ductus ad naſum, leſt after the cure of the abſceſs, it ſhould ſtill remain obſtructed; and if upon trial the duct ſhould be ſo filled up as not to admit the wire, it will be right to keep open the perforation into the noſe with a ſmall tent, till the diſcharge is almoſt quite ceaſed.

I ſhall finiſh this chapter with obſerving, that though a weeping eye will ſometimes remain after the treatment of the fiſtula lachrymalis, yet the inconvenience of it is ſo ſmall, compared with a diſcharge of matter, that it would be happy if this were the worſt conſequence of the operation; but it ſometimes happens, that the ulcer, when healed, breaks out again, and ſometimes too, that it cannot be quite healed, by reaſon of the inferior part of the ſaccus and naſal duct lying ſo deep below the edge of the orbit, which makes the proper application of dreſſings to the bottom of the ulcer more difficult: it is this ſituation of the ſaccus, that in a great meaſure prevents any good effects from burning, and perforating, if the perforation only be dreſſed, as is very much practiſed, ſince the dreſſing will be full four-tenths of an inch above the loweſt part of the ulcer.

With regard to the triskling of the tears, though, generally ſpeaking, it is prevented by the method I have recommended; yet it does not appear at all wonderful, it ſhould ſo frequently be the conſequence of the others, when we conſider how much at beſt the ſaccus contracts after a great deal of it has been deſtroyed; and how poſſible it is for the wound to fill up with granulations of fleſh, which cannot fail to prove an obſtacle to their paſſage into the noſe.

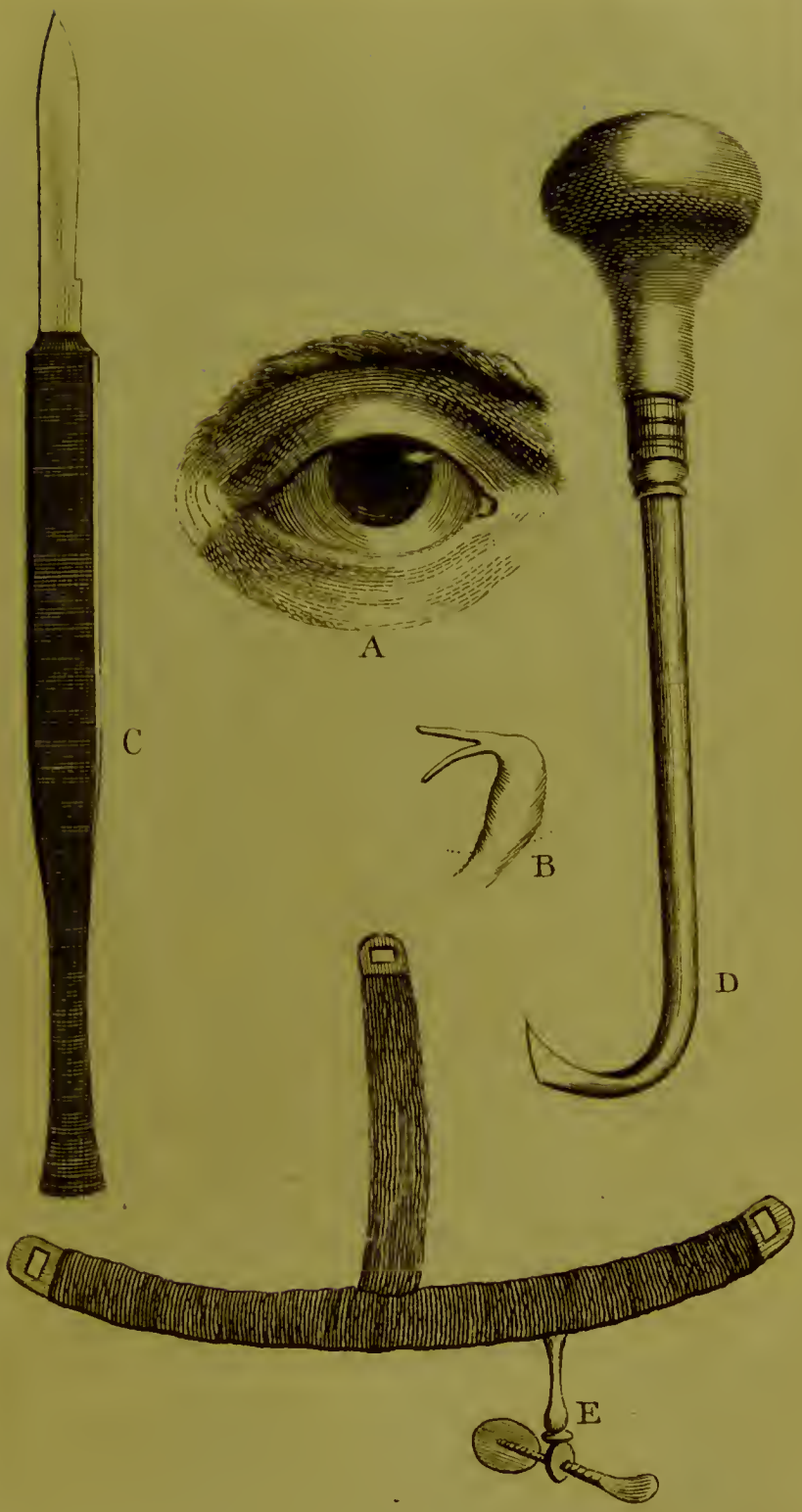
PLATE XI.

THE EXPLANATION.

A. The eye, with the ſkin of the eye-lids, denuded, in order to ſhew the orbicularis muſcle: the white ſtreak running from the inner angle of the eye towards the noſe, is called the tendon of the orbicularis muſcle, though I think it rather a ſmall ligament. At a little diſtance from the internal angle, on the edge of the eye-lids, may be obſerved two black ſpots, which are the orifices of the lachrymal channels, and called the puncta lachrymalia.

B. The exact dimenſion of the lachrymal channels and bag; the pricked line repreſents the edge of the orbit. I have here taken care to ſhew the oblique direction of the bag, as it runs from the noſe towards the orbit.

From comparing this figure with the ſituation of the puncta lachrymalia in the foregoing one, it will appear that only the upper part of the bag lies under the tendon of the orbicularis muſcle, and conſequently is the only part wounded, and burnt through in the common operation, when the perforator is carried horizontally from the angle into the noſe, as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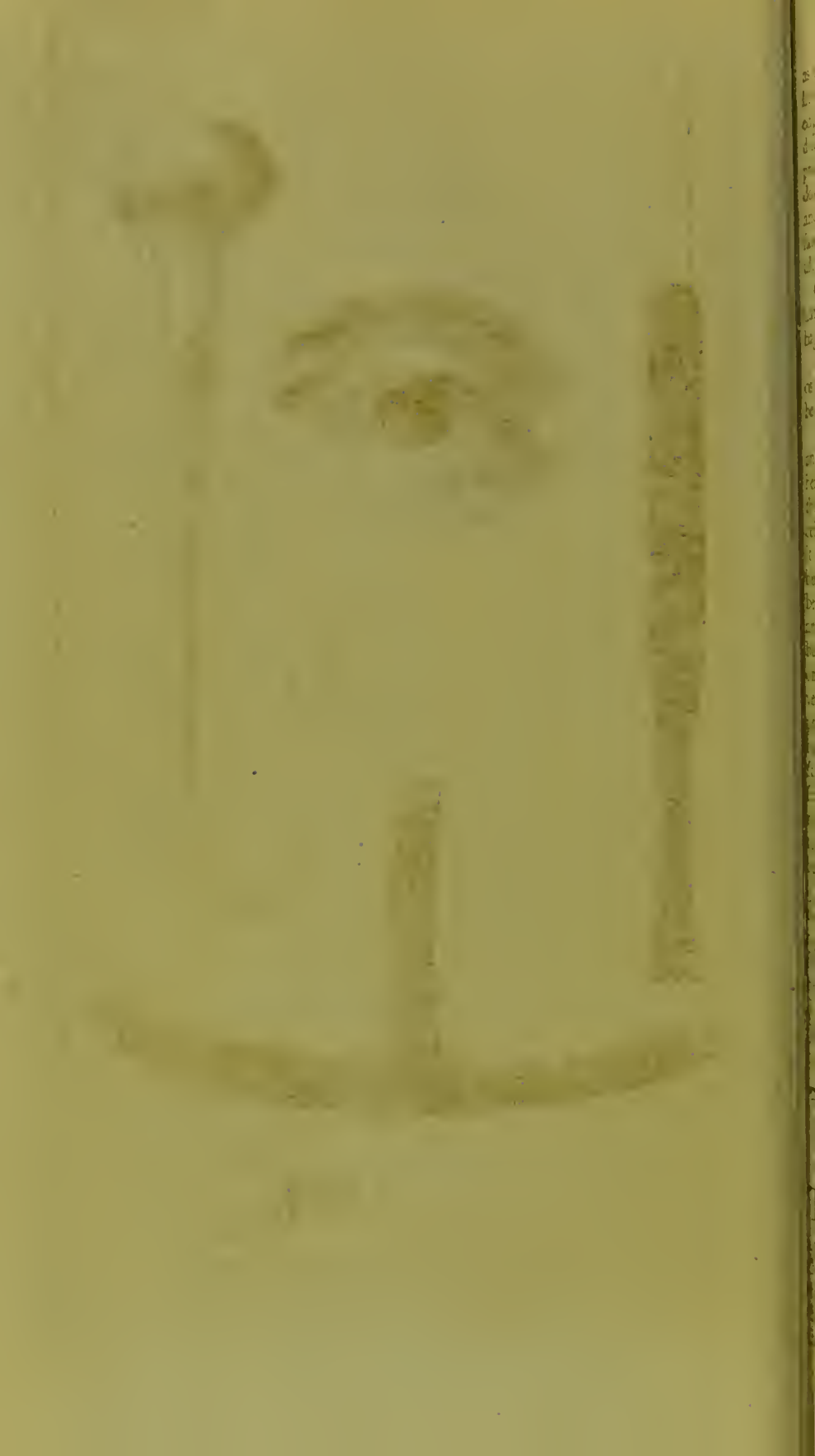

as is generally practiſed. And I believe the ſize of the bag here repreſented, though not ſo large as when it is diſeaſed, will at once ſhew the propriety of opening it firſt by an inciſion down to the orbit, or even farther, and then treating the fiſtula with the ſame dreſſings as we do other fiſtulous ulcers.

C. A ſmall inciſion-knife, more handy than a larger for opening the bag.

D. The perforater, to deſtroy the os unguis, if ever it ſhould happen to be neceſſary.

E. An iron inſtrument, made thin and pliable, to ſet even on the forehead, and for uſe covered with velvet; the holes at the three extremities receive two pieces of ribbon, by which it is faſtened on the forehead: the button at the end of the ſcrew is to be placed on the ſaccus lachrymalis, and the ſcrew to be twiſted till the button makes a conſiderable preſſure on the bag: the button ſhould be covered with velvet, and a little compreſs of plaſter ſhould be laid on the bag before it is applied, to prevent the ſkin from being galled by the preſſure. The little branch of iron which receives the ſcrew, muſt be ſoft enough to admit of bending, otherwiſe it will be difficult to place the button exactly on the bag. This inſtrument is for the left eye only. It ſhould be worn night and day in the beginning of a fiſtula, and after a fiſtula has been healed by inciſion; but as the ſucceſs depends upon the exact ſituation of the button upon the bag, it ſhould be carefully looked after.

CHAP. XXXII.

OF THE BRONCHOTOMY.

THE operation of bronchotomy is an inciſion made in the aſpera arteria, to make way for the air into the lungs, when reſpiration is obſtructed by any tumour compreſſing the larynx, or ſome other diſorder of the glottis and aſpera arteria, without any apparent tumour. Theſe are the caſes in which it is ſuppoſed to be uſeful; but I am inclined to think it hardly ever can be of ſervice, but where the complaint is attended with ſome ſwelling, ſince I cannot find any inſtance to my ſatisfaction of good done by this operation in the other ſpecies of angina; nor has it appeared, upon examination of ſeveral who have died of it, that the air was obſtructed by any ſtricture of the glottis or aſpera arteria: if then the paſſage remains open, and reſpiration be diſturbed from other cauſes, the making a new orifice can be but of little advantage. I once performed it under this circumſtance, but it gave no ſort of relief.

Upon the whole then, I imagine the practice of this operation uſeful only in that ſpecies of angina, where the throat is exceedingly enlarged by the ſwelling of the thyroid gland, and parts adjacent, called bronchocele, which, by their weight, may preſs upon the trachea, ſo as to make it in ſome degree narrower, and prevent the free courſe of the air to and from the lungs. But ſhould any one judge it proper in the inſtance I object to, the operation is ſo eaſy to perform, and ſo utterly void of any danger whatſoever, notwithſtanding the frightful cautions laid down by writers, that I would not altogether diſcourage the trial, till I have farther proof of its inſignificance.

The manner of doing it is by making a longitudinal inciſion through the ſkin, three quarters of an inch long, oppoſite to the third and fourth ring of the trachea, if you have the choice of the place; and when you cannot make it ſo high, the rule will be to wound a little below the tumour: it is always adviſed to pinch up the ſkin for this proceſs, which however may be left to the diſcretion of the ſurgeon. When the ſkin is cut through, you muſt make a ſmall tranſverſe inciſion into the wind-pipe, and immediately introduce a ſilver crooked canula near half an inch

long, with a couple of little rings at the top of it, through which a ribbone may be paſſed round the neck, to keep it fixed in the wound.

Some have preſcribed making an inciſion through the ſkin and trachea at once, with a lancet or knife, as the more eaſy and expeditious method; and I once ſaw it performed in that manner, but it proved very inconvenient; for the wind-pipe in reſpiration moving up and down, ſlipped from the orifice of the ſkin, and made it very difficult to introduce the canula, and afterwards to maintain it in its ſituation: wherefore I think it abſolutely neceſſary, to make the external inciſion longitudinal, and even pretty large, as I have directed above.

The caution laid down of raiſing the ſternohyoidei and ſternothyroidei muſcles, before cutting the wind-pipe, is not to be regarded; and as to the diviſion of the recurrent nerves and blood-veſſels, ſo much apprehended in this operation, it is not in the leaſt to be feared; ſince they are quite out of the reach of the inſtrument, as any one ſkilled in the anatomy of thoſe parts muſt very well know.

The method of dreſſing will be eaſily underſtood, ſince after the patient can breathe by the natural paſſage, if you withdraw the hollow tent, the wound will become a ſimple one, and notwithſtanding its penetration through a cartilage into a large cavity, require a ſuperficial application only.

CHAP. XXXII.

OF THE EXTIRPATION OF THE TONSILS.

THESE glands ſometimes grow ſo large and ſcirrhous as to become incurable, and even to threaten ſuffocation, if not extirpated. The manner of doing this operation formerly, was, by cutting them off; but the almoſt conſtant conſequence of this wound was a violent bleeding, and ſometimes too a mortal one; on which account it is rejected in favour of the ligature, which is not only void of danger, but alſo ſeldom fails of cure.

If the baſis of the tonſil is ſmaller than the upper part, you may paſs the ligature by tying it to the end of a probe, bent into the form of an arch, and ſet into a handle, which being carried beyond the gland, and round it, is to be brought back again; this done, you may eaſily tie it by the means of an inſtrument of Mr. Cheſelden's contrivance, which holds one end of the ſtring on the ſide of the tonſil next the throat, while you make the knot by pulling the other with the right hand quite out of the mouth, as will be eaſily underſtood by the draught in the copper-plate. Should it happen that the tonſils are conical, ſo that the ligature will neceſſarily ſlip over its extremity when we attempt to tie, in this caſe he has recommended an inſtrument like a crooked needle, ſet in a handle, with an eye near the point threaded with a ligature, which is to be thruſt through the bottom of the gland, and being laid hold of with a hook, the inſtrument is to be withdrawn; then pulling the double ligature forwards, it muſt be divided, and one part be tied above, and the other below the tumour: the knots are to be always double, and the ligature to be cut off pretty near them: however, to confeſs the truth, I have never in one inſtance been obliged to uſe this method; for where the tonſils have been conical, I have employed a very thin thread, which has cut into the ſubſtance of the gland a little, and making a ſmall groove, prevented its ſliding over. If after four or five days they ſlip, or ſeem to have mortified the tonſil only in part, you muſt repeat the whole operation; and if it fail a ſecond time, you muſt even repeat it again, as I have ſometimes done, though it frequently happens, that the cure is effected by the firſt operation.

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This kind of extirpation is more practiſed in large piles, that are eſteemed incurable; and if the ſucceſs of it were better known, the operation would be much more frequent. I have by this method cured ſeveral people that have diſcharged blood every ſtool for many years, and ſome that have been almoſt quite deſtroyed by the repeated leſſes of it. When the piles are withinſide of the inteſtine, you muſt place your patient over a fomentation in a cloſe-ſtool, and have a crooked needle with a double ligature ready to paſs through them, when by ſtraining they are puſhed out of the anus (for ſometimes the inteſtine will return ſuddenly) and tie above and below as in the inſtance of the tonſil.—Sometimes the piles are of that ſhape as to admit a ſingle ligature to be tied round them without the help of a needle, which is leſs painful: if there are ſeveral, you muſt only tie one or two at a time; for the pain of the ligature is exceſſive, and would be intolerable if many were tied at once: however, every five or ſix days, the operation may be repeated, till all are extirpated, and the parts muſt be kept ſupple by ſome emollient ointments.

When the piles are ſmall, they may ſafely, and with much leſs pain, be cut off; but when this method has been taken with very large ones, I have ſeen the patient in the utmoſt danger, from a violent effuſion of blood.

The uvula is ſubject to ſo great a degree of relaxation ſometimes, that it almoſt choaks the patient; the readieſt cure is cutting off all but half an inch of it, which may be done at one ſnip with a pair of ſciſſars (particularly curved for that purpoſe) laying hold of it with a forceps, leſt it ſhould ſlip away. I once cut off a uvula that lay rolled upon the tongue about two inches; the patient recovered immediately, and never felt any inconvenience afterwards.

PLATE XII.

THE EXPLANATION.

A. The bent probe fixed in a handle, with the ligature made of the ſame thread as the ligatures for trying the blood-veſſels.

B. The iron inſtrument for tying the tonſils.

I have here made a knot upon a pin, which is to be ſuppoſed in the ſituation of one of the tonſils, and may eaſily be imagined to have been tied by puſhing the ſtring beyond it, when held firm by one hand againſt the inſtrument, and pulled by the other, on the outſide of the mouth.

This inſtrument is alſo of great ſervice in extirpating, by ligature, a ſpecies of ſcirrhus that ſometimes grows from the neck or cavity of the uterus.

C. The needle with the eye towards the point, for paſſing the ligature through the tonſil, when the baſis is larger than the extremity.

D. A canula made of ſilver, to be uſed in the empyema.

E. A canula to be uſed in bronchotomy.

To keep the canulas in their place, ſmall ribbons may be paſſed through the rings of them, and carried round the body and neck; or they may be held by a ligature run through, and faſtened to a hole cut in a piece of ſticking-plaſter, which is to be laid on each ſide of them.

CHAP. XXXIII.

OF THE POLYPUS.

THE polypus of the noſe is ſaid to be an excreſcence of fleſh, ſpreading its branches amongſt the laminæ of the os ethmoides, and through the whole cavity of one or both noſtrils. It happens very often to both ſides of the noſe at once, and in that caſe is very troubleſome, almoſt ſuffocating the patient, at leaſt making reſpiration very difficult. The intent of the operation is the removal of

of this obſtacle; but as it is attended with different events from the variety of nature in the ſeveral ſorts of polypuſes, I ſhall endeavour to diſtinguiſh their ſpecies, ſo as to lead us into ſome judgement of the greater or leſs probability of ſucceſs.

They all ariſe from the membrane ſpread upon the lamina ſpongioſæ, pretty nearly in the ſame manner as the hydatids of the abdomen, in one kind of dropſy, do from the ſurface of the liver; or as ganglions from the tendons, borrowing their coats from a production of its fibres and veſſels: if they appear ſoft, and of the colour of the ſerum of the blood, in all likelihood they are formed of ſuch a ſort of water contained in cyſts, which, upon breaking the membrane, leaves ſo little hold for the inſtrument, that but a ſmall part of it can be extracted afterwards. This polypus is to be left to harden, before the operation be undertaken, which in proceſs of time it generally will do. In the next degree of conſiſtence, they retain pretty nearly the ſame colour, and are often partly watery, and partly of a viſcid texture, which though not tenacious enough to admit of drawing them out by the roots, may at ſeveral attempts be taken away by bits. The next degree of conſiſtence, is that which is neither ſo ſoft as to be ſqueezed to pieces, nor ſo hard and brittle as to crumble, or adhere to the membrane with that force as not to admit of ſeparation: this is the moſt favourable one. The laſt, is hard and ſcirrhous, adhering ſo tight as to tear rather than ſeparate in the extraction, and ſometimes even tends to degenerate into a cancer: this polypus is very difficult of cure.

The polypus ſometimes dilates to that degree, as not only to extend beyond the os palati, and hang over the œſophagus and trachea, but alſo ſpreading into the ſinus maxillaris, ſo exactly fills up every interſtice of the noſe, as to obſtruct the lower orifice of the ductus ad naſum, and prevent the deſcent of the tears, which neceſſarily muſt return through the puncta lachrymalia: and ſometimes they grow ſo enormouſly large, as even to alter the ſhape of the bones of the face.

When the polypus appears in the throat, it is always adviſeable to extract it that way; it being found by experience, more ready to looſen when pulled in that direction, than by the noſe. To this end, it would be right, before undertaking the operation, to let your patient lie ſupine two or three hours, which will bring it ſtill farther down; for the body of the polypus does not univerſally adhere, and will by its weight ſtretch out the fibres, by which it is connected to the noſe; nay, there are inſtances where, by a little effort, ſuch as hawking, they have dropped quite off.

The method of extracting it is, by a pair of forceps, with a ſlit at their extremities for the better hold, which muſt be introduced into the noſtril about an inch and a half, to make more ſure of it towards the roots; then twiſting them a little from one ſide to the other, you muſt continue in that action, while you pull very gradually the body of the polypus. If it break, you muſt repeat the extraction as long as any remains, unleſs it is attended with a violent hæmorrhage, which is an accident that ſometimes follows upon the operation, and ſeldom fails when the excreſcence is ſcirrhous: however, the ſurgeon is not to be alarmed at the appearance of an immoderate effuſion the moment after the ſeparation, for, generally ſpeaking, the veſſels collapſe very ſoon again; but if they do not, dry lint, or lint dipped in ſome ſtyptic, will readily ſtop it.

After the extirpation, it has been uſual, in order to prevent a relapſe, to dreſs with eſcharotic powders, and even to burn with the actual cautery: but neither the one or the other can be of great ſervice in this caſe, and both are painful and dangerous. If ever the uſe of corroſive medicines is adviſeable,

adviſeable, it ſhould be for deſtroying the remainder of a polypus, which cannot all be taken away; and then the eſcharotics may, in my opinion, be better conveyed to the part by a long tent, than a ſeton paſſed through the noſe and mouth, which is difficult to do without hurting the patient, and very naſty to bear, though this is the method at preſent practiſed, and recommended by ſome eminent ſurgeons.

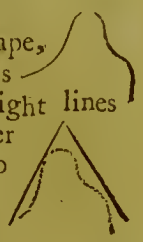
CHAP. XXXIV.

OF THE HARE-LIP.

THE diſeaſe is a fiſſure in the upper lip, with want of ſubſtance, and is a natural defect, the patient being always born with it, at leaſt that ſpecies of hare-lip which requires the operation I am going to deſcribe. The cure is to be performed by the twiſted ſuture, the explanation of which I have reſerved for this chapter. There are many lips, where the loſs of ſubſtance is ſo great, that the edges of the fiſſure cannot be brought together, or at beſt where they can but juſt touch, in which caſe it need not be adviſed to forbear the attempt: it is likewiſe forbidden in infants, and with reaſon if they ſuck, but otherwiſe it may be undertaken with great ſafety, and even with more probability of ſucceſs than in others that are older, as I have myſelf experienced.

It is not uncommon for the roof of the mouth to be fiſſured likewiſe; but this is no objection to the operation, if the ſkin of the lip is looſe enough to admit of re-union: and it may be remarked, that the fiſſure of the palate, in length of years, cloſes ſurpriſingly in ſome caſes.

The manner of doing it is this;—you firſt with a knife ſeparate the lip from the upper jaw, by dividing the frænulum between it and the gums; and if the dentes inciſorii project, as is uſual in infants, they muſt be cut out with the ſame knife; then with a thin pair of ſtraight ſciſſars take off the callous edges of the fiſſure the whole length of it, obſerving the ruſe of making the new wound in ſtraight lines, becauſe the ſides of it can never be made to correſpond without this caution.—For inſtance,



If the hare-lip had this ſhape, the inciſion of the edges muſt be continued in ſtraight lines till they meet in the manner here repreſented. The two lips of the wound being brought exactly together, you paſs a couple of pins, one pretty near the top, and the other as near the bottom, through the middle of both edges of it, and ſecure them in that ſituation by twiſting a piece of waxed thread croſs and round the pins ſeven or eight times; you muſt then cut off the points, and lay a ſmall bolſter of plaſter underneath them, to prevent their ſcratching: but when the lower part only of the hare-lip can be brought into contact, it will not be proper to uſe more than one pin.

The pins I employ are made three fourths of their lengths of ſilver, and the other part towards the point, of ſteel; the ſilver pin is not quite ſo offenſive to a wound as a braſs or ſteel one; but a ſteel point is neceſſary for their eaſier penetration, which indeed makes them paſs ſo readily, that there is no need of the inſtrument to aſſiſt in puſhing them through. The practice of bolſtering the cheeks forward does little or no ſervice to the wound, and is very uneaſy to the patient; wherefore I would not adviſe the uſe of it. The manner of dreſſing will be to remove the applications, which are quite ſuperficial, as often only as is neceſſary for cleanlineſs. The method I would recommend is, to deſiſt the three firſt days, and afterwards to do it every day: I do not think it at all requiſite to dreſs between the jaw and lip where the frœnulum was wounded, there being no danger that an inconvenient adheſion ſhould enſue. In about

about eight or nine days, the parts are usually united, and in children much sooner, when you must gently cut the threads, and draw out the pins, applying upon the orifices a piece of plaster and dry lint. It will be proper, in order to withdraw the pins more easily, to dab the ligatures and pins with warm water, and also moisten them with sweet oil, two or three days before you remove them, which will wash off the coagulated blood, that would otherwise fasten them so hard to the ligature as to make the extraction painful.

The twisted suture is of great service in fistulas of the urethra remaining after the operation for the stone, in which case the callous edges may be cut off, and the lips of the wound be held together by this method.

CHAP. XXXV.

OF THE WRY NECK.

THE operation of cutting the wry neck is very uncommon, and is never to be practised but when the disorder is owing to a contraction of the mastoideus muscle only; as it can answer no purpose to set that muscle free by dividing it (which is all that is to be done) if the others in the neck are in the same state, and more especially if it has been of long standing from infancy; because the growth of the vertebræ will have been determined in that direction, and make it impossible to set the head upright.

When the case is fair, the operation is this. Having laid your patient on a table, make a transverse incision through the skin and fat, something broader than the muscle, and not above half an inch from the clavicle; then passing the probed razor with care underneath the muscle, draw it out and cut the muscle. The great vessels of the neck lie underneath; but I think, when we are aware of their situation, the danger of wounding them may be avoided. After the incision is made, the wound is to be crammed with dry lint, and always dressed so as to prevent the extremities of the muscle from re-uniting; to which end, they are to be separated from each other as much as possible by the assistance of a supporting bandage for the head, during the whole time of the cure, which will generally be about a month.

PLATE XIII.

THE EXPLANATION.

A. The instrument called the probe-razor, to cut the mastoideus muscle in the wry neck, and is sharp only about half its length, at that end where the blade is broad.

B. The two pins with the twisted suture, used in the hare-lip.

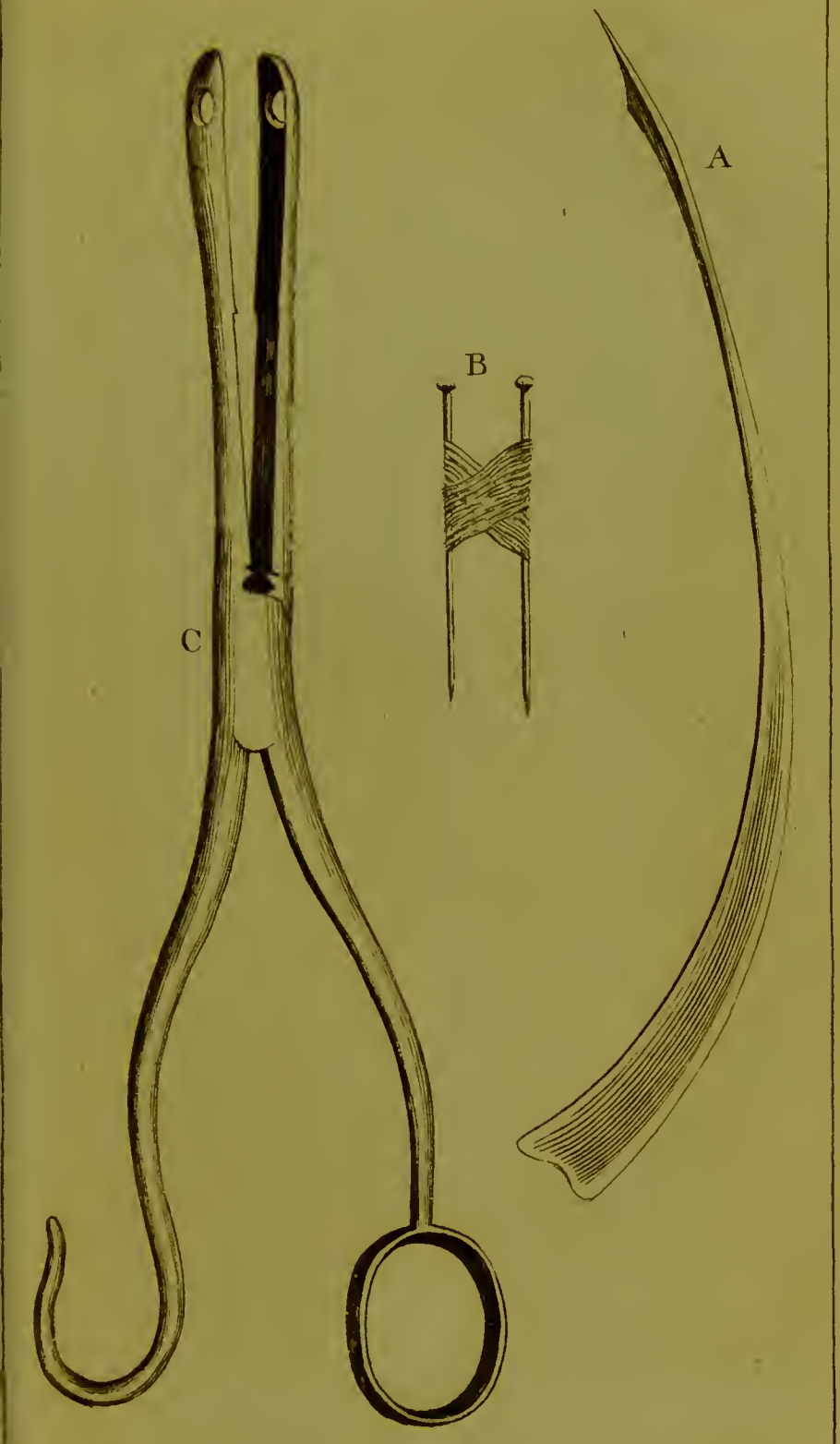
C. The polypus forceps, with one of the rings open for the reception of the thumb, which would be cramped in pulling the forceps with much force, if it were received in the same sort of ring as in the other handle. It is for this reason I have represented the stone forceps with open rings.

CHAP. XXXVI.

OF THE ANEURISM.

THIS is a disease of the arteries, in which, either by a preternatural weakness of any part of them, they become excessively dilated, or by a wound through their coats, the blood is extravasated amongst the adjacent cavities. The first species of aneurism is incident to every part of the body, but does not often happen, except to the curvature of the aorta, which is subject to this disorder from the extraordinary impulse of the blood on that part: from the curvature it runs upwards along the carotids, or subclavians, generally increasing, till by its great distension it is ruptured, and the patient dies.

There


A
B
C

There have been great disputes amongst writers, concerning the nature of this dilatation of the artery; some even denying the fact, and supposing it always a rupture; some, that all the coats are distended; others, only the external one; and again others, whose doctrine has been the best received, that the internal coat was ruptured, and the external dilated: these last have supported their hypothesis with arguments drawn from the anatomy of the internal coats which is ligamentous, and incapable of much distension; so that if an artery be inflated with a sufficient force, the air will burst that coat, and expand the external one, that is, make an artificial aneurism, in the same manner as blood is supposed to make a natural one: but this argument is of little force, when we consider, that there are many parts of an animal body, which violence cannot stretch considerably, but which, by the gradual influx of the juices, become susceptible of monstrous distension, as is the case of the uterus, and, upon observation, is evidently the case likewise of all the coats of the artery, as I have had an opportunity to examine in several aneurisms in the collection of the late Dr. Douglas, which he was so kind to lend me for that purpose.

There are several histories given of aneurisms of the curvature of the aorta, in some of which the vessel has been so excessively dilated, as to possess a great space of the upper part of the thorax; and the most curious circumstance to be gathered from them is, that the spot of the vessel which is weakest, and where the disease begins, generally gives way in such a manner to the force of the blood continually pushing it outwards, as to form a large pouch or cyst, with coats nearly as thick as those of the artery itself: however, the thickness of the coats of these cysts will last but to a certain period; for when the vessels of the coats can no longer conform to the extension, the circulation grows languid, the cyst becomes thinner at its apex, and soon after bursts.

From this description of the cyst, it will be understood to resemble the bladder, having a large cavity, and a narrow neck or opening.

The symptoms of this aneurism, are a strong pulsation against the sternum and ribs, every systole of the heart; and when it extends above the sternum, a tumour with pulsation: upon dissection, the ribs, sternum, and clavicle, are sometimes found carious, from the obstruction of the vessels of the periosteum, which are pressed by the tumour. What are the causes of a particular weakness in any of the coats of the artery, I cannot take upon me to determine: but it is worth observing, that the dilated aorta every where in the neighbourhood of the cyst, is generally ossified; and indeed ossifications, or indurations of the artery, appear so constantly in the beginnings of aneurisms of the aorta, that it is not easy to judge whether they are the cause or the effect of them.

What I have spoken of hitherto, has been only the aneurism of the thorax, from an internal disorder; aneurisms of the extremities are, for the most part, owing to wounds, though when they happen of themselves, they differ very little from the description I have given of that in the thorax: the farther symptoms of them are (besides pulsation) the tumour's being without discolouration in the skin; its subsiding when pressed by the hand, and immediately returning when the hand is taken away; though if it be upon the point of bursting, the skin will grow inflamed, and the coagulated blood in the cyst will sometimes make the pulsation much less perceptible.

This species of aneurism may sometimes be supported a great number of years, if we resist its dilitation by proper bandages; but if we do not, there is danger of its bursting; and, if it be pretty large, of rotting the adjacent bones.

A sound artery wounded through

part of its external coat, would, in all probability, produce nearly the same appearances as where the whole coat is weakened from an internal indisposition; and this most likely is the case after bleeding in the arm, when it has not been immediately perceived that the artery was pricked, and the tumour has begun to form some days after the puncture; though the common appearance of an aneurism from the wound of a lancet, is a discharge of blood first through the orifice of the skin, and, upon being stopped from bleeding outwardly, an insinuation of it among all the muscles as far as it can spread, in the shoulder and arm: here the arm grows livid from the ecchymosis, and the blood coagulating to the consistence of flesh, prevents any sensible pulsation. The cyst which arises near the orifice of the artery is formed by the cellular capsula enveloping the vessels of that part, and a portion of the aponeurosis of the biceps muscle, which admitting of some extravasated blood underneath it, become excessively thickened and expanded: these membranes must make the cyst, otherwise we could not, upon opening the tumour in the operation, discover so readily the puncture; or if the coats of the artery made it, we could not separate it distinctly from the vessel, which would be always dilated above and below the cyst, as we see in other aneurisms.

There are some few instances of small aneurisms and punctures of the artery from bleeding, doing well by bandage; but they almost all require the operation at last, which is to be performed nearly in the same manner in every part; and supposing it in the bend of the arm, is to be done after the following method:

Having applied the tourniquet near the shoulder, and laid the arm in a convenient situation, make an incision on the inside of the biceps muscle, above and below the elbow a considerable length, which being in the course of the artery, will discover it as soon as you have taken away the coagulated blood, which must be all removed with the fingers, the wound being dilated sufficiently for that purpose: if the orifice does not readily appear, let the tourniquet be loosened, and the effusion of blood will direct you to it: then carefully carrying a crooked needle with a ligature under it, tie the vessel just above the orifice, and passing the needle again, make a second ligature below it, to prevent the return of the blood, and leave the intermediate piece of the vessel to slough away without dividing it. To avoid wounding or tying the nerve in making the ligature, the artery may be cleared away from it first, and held up with a hook; but should the nerve be tied with the artery, no great inconvenience would ensue from it. After the operation, the arm must be laid easy on a pillow in bed, and the wound be treated in the common method, keeping it in that posture a fortnight or three weeks, especially if it should swell much, and not digest kindly.

In doing this operation, it will be proper to have the amputating instruments ready, lest it should be impracticable to tie the artery, though I have never met with such an instance; and even after having tied it, the arm must be carefully watched; that in case of a mortification it may be taken off; which, though from experience we learn is very seldom the consequence, should to all appearance be the perpetual one; for these aneurisms following always upon bleeding the basilic vein, must necessarily be aneurisms of the humeral artery, near an inch above its division, which being obstructed by the ligature, one would think should necessarily bring on a mortification; but we see the contrary, though for some time after the operation we can hardly distinguish the least degree of pulse, and ever after it continues languid. If the humeral artery happens to divide above the elbow, which is not very uncommon, the prospect of cure is better, and the pulse will be stronger after the operation.

CHAP. XXXVII.

OF AMPUTATION.

A Spreading mortification has been always eſteemed ſo principal a cauſe for amputation, that it is a fashion with writers to treat of the nature of a gangrene, previous to the deſcription of this operation; and I think they have all agreed, that whatever the ſpecies of it be, if the remedies they preſcribe do not prevent its progreſs, the limb muſt be amputated: however, this operation is ſpoken of as frequently unſucceſsful, and, in length of time, its want of ſucceſs has been ſo unqueſtionably confirmed by repeated experiments, that ſome of the moſt eminent practitioners here in England, make that very circumſtance an exception to the operation, which ſo few years ſince was the great inducement; and the maxim now is, never to extirpate till the mortification is abſolutely ſtopped, and even advanced in its ſeparation.

Gangrenes may be produced two ways; either by indiſpoſition of body, or by accident in a healthful ſtate; for as the life of a part depends upon the circulation of its fluids, whatever ſhall make the circulation ceaſe, will inevitably occaſion a gangrene. Thus, a mere compreſs, preventing the courſe of the blood, as effectually cauſes a mortification, as any indiſpoſition in the fluids or veſſels.

It frequently happens in old age, that the arteries of the lower extremities oſſify, which, deſtroying their elaſticity, muſt in conſequence produce a gangrene in the toes firſt, and afterwards in the limb nearly as high as where the oſſification terminates; ſo that in mortifications ariſing from this cauſe, we at once ſee why amputation, during their increaſe, is of ſo little ſervice, unleſs performed above the oſſification; but we have no way to judge where the oſſification ends, but by the inference we make from the gangrene's ſtopping; hence we may learn the propriety of our modern practice in this caſe.

If by any accident the limb has been injured to that violent degree as to begin to mortify, it will be no more fit to operate here till it ſtops, than in the other inſtance; becauſe all parts that are mortified, have had the diſpoſition to become ſo, before the effect is produced; and cutting off a limb, half an inch above the abſolute dead ſkin, is generally leaving a part behind with the ſeeds of a mortification in it; ſo, unleſs we can be ſure the veſſels are not affected to the place of amputation, which will be hard to know but from the conſequence, the operation will be uſeleſs.

Sometimes the fluids of the body are ſo vitiated, as to loſe their proper nutritious qualities; and the limb becomes gangrened, not from any alteration it its veſſels, but chiefly from its ſituation, which being at a great diſtance from the heart, will be more prone to feel the ill effects of a bad blood than any other part, as the circulation is more languid in the extremities: and it ſeems not very improbable that in ſome diſpoſitions of the blood, a mortification may alſo be a kind of critical diſcharge. When therefore a gangrene ariſing from either of theſe cauſes, is running on, amputation above it will, for the moſt part, be uſeleſs, ſince it is only removing one degree of the effects of the bad juices, and leaving them in the ſame ſtate to produce the like miſchief in other parts: thus we ſee, after amputations on this account, the gangrene ſometimes falls on the bowels, or the other extremeties; from which obſervation, I think we may conclude it not ſafe to amputate till the fluids are altered; and this alteration will preſently diſcover itſelf by the ſtopping of the mortification.

I have laid it down as a rule, that the mortification ſhould not only be ſtopped, but advanced in its ſeparation; the reaſon of which is, that though the blood is ſo much altered for the better as to occaſion a ſtop-

page of the gangrene, yet at this point of alteration, it is ſtill in a bad ſtate, and ſhould be left to mend, with the utmoſt tranquillity of body, and aſſiſtance of cordial medicines, till ſuch time as granulations of fleſh upon the living part of the extremity, ſhew the balſamic diſpoſition of the blood; in the mean while, to take off the ſtench of the gangrene, it may be wrapped up in ſpirituous or odoriferous applications. I have ſeen ſome limbs taken off immediately upon the mortification's ceaſing, when afterwards the patients have ſunk from frequent effuſions of blood, not diſcharged by the great veſſels, but the whole ſtump: theſe hæmorrhages I conceive were owing to the thinneſs of the blood, which hardly gave a reddiſh tincture to the cloths and bandages: on the other hand, upon waiting a conſiderable time after the ceaſing of the mortification, I have taken off ſome myſelf with as good ſucceſs as for any other diſorder.

Gun-ſhot wounds, compound fractures, and all ſudden accidents requiring amputation, are attended with the beſt ſucceſs if immediately performed. Diſorders of the joints, ulcers of long ſtanding, and all ſcrophulous tumours, do ſometimes return on other parts after the operation. When a leg is to be amputated, the manner of doing it is this:

Lay your patient on a table two feet ſix inches high, which is much better than a low ſeat, both for ſecuring him ſteady, and giving yourſelf the advantage of operating without ſtooping, which is not only painful, but inconvenient in the other ſituation. While one of the aſſiſtants holds the leg, you muſt roll a ſlip of fine rag half an inch broad, three or four times round it, about four or five inches below the inferior extremity of the patella: this being pinned on, is to ſerve as a guide for the knife, which, without it, perhaps would not be directed ſo dexterouſly: the manner of rolling has always been perpendicular to the length of the leg; but having ſometimes obſerved, that though the amputation at firſt be even, yet afterwards the gaſtrocnemius muſcle contracting, draws back the inferior part of the ſtump more ſtrongly than the other muſcles can do the reſt of it, I have lately, in order to preſerve the regularity of the cicatrix, allowed for this exceſs of contraction, and made the circular inciſion in ſuch a manner, that the part of the wound which is on the calf of the leg is a little farther from the ham, than that on the ſhin is from the middle of the patella.

In the mean time, one of your aſſiſtants muſt carry a ſtrong ligature round the thigh, about three or four inches above the patella, which paſſing through a couple of ſlits in a ſquare piece of leather, he muſt twiſt with a tourniquet, till the artery is ſufficiently compreſſed, to prevent any great effuſion of blood; and to do it more effectually, he may lay a bolſter of tow or linen under the ligature, upon that part where the artery creeps. It will alſo be a little more eaſy to the patient, to carry a compreſs of linen, three or four times double, round the thigh, on that part where the ligature is applied, in order to prevent it from cutting the ſkin.

The courſe of the blood being ſtopped, you muſt begin your inciſion juſt below the linen roller, on the under part of the limb, bringing your knife towards you, which at one ſweep may cut more than the ſemicircle; then beginning your ſecond wound on the upper part, it muſt be continued from the one extremity to the other of the firſt wound, making them but one line. Theſe inciſions muſt be made quite through the membrana adipoſa, as far as the muſcles; then taking off the linen roller, and an aſſiſtant drawing back the ſkin as far as it will go, you make your wound from the edges of it when drawn back through the fleſh to the bone, in the ſame manner as you did through the ſkin. Before you ſaw the bones, you muſt cut the ligament between

tween them, with the point of your knife, and the aſſiſtant who holds the leg while it is ſawing, muſt obſerve not to lift it upwards, which would clog the inſtrument; and at the ſame time not to let it drop, leſt the weight of the limb ſhould fracture the bone before it is quite ſawed through.

In amputating below the knee, it is of advantage to ſtand on the inſide of the leg; becauſe the tibia and fibula lie in a poſition to be ſawed at the ſame time, if the inſtrument be applied externally: whereas, if we lay it on the inſide of the leg, the tibia will be divided firſt, and the fibula afterwards; which not only lengthens the operation, but it is alſo apt to ſplinter the fibula when it is almoſt ſawed through, unleſs the aſſiſtant be very careful in ſupporting it.

When the leg is taken off, the next regard is to be had to the ſtopping the blood, which muſt be effectually done before the patient is put to bed, or there will be great danger of bleeding again, when the fever is excited, and the veſſels of the ſtump dilated, both which happen a very little while after the operation. There is no method for this purpoſe ſo ſecure as taking up the extremities of the veſſels with a needle and ligature, in the following manner: As ſoon as the amputation is performed, the aſſiſtant muſt looſen the tourniquet for a moment, upon which the orifices of the arteries will appear by the iſſue of the blood. The operator having then fixed his eye upon one of the largeſt veſſels, paſſes a crooked needle through the fleſh, a little more than a quarter of an inch above the orifice, and about the ſame depth, in ſuch a direction, as to make nearly one-third of a circle round the veſſel; then withdrawing the needle, he a ſecond time paſſes it into the fleſh and out again, in the ſame manner, and about the ſame diſtance below the orifice of the veſſel: by this means the thread will almoſt encompaſs the veſſel, and when it is tied (which ſhould be done by the ſurgeon's knot) will neceſſarily incloſe it within the ſtricture. All the conſiderable arteries are to be taken up in the ſame manner;—that is, the tourniquet is to be looſened, in order to diſcover the veſſel, and then the needle is to be paſſed round it, as I have here deſcribed. This is a much better way than uſing the artery forceps, where the veſſels are apt to ſlip away out of the ligature; and as to ſtyptic applications, their want of ſafety is ſo well known now, that the uſe of them, in hæmorrhages from large veſſels, is almoſt univerſally rejected; though it is thought by ſeveral ſurgeons who have experienced the virtue of agaric, that it will be found to be a more powerful aſtringent than any hitherto diſcovered.

It ſometimes happens in a large ſtump, that ten or more veſſels require tying, which done, you muſt apply looſe dry lint to the wound; or in caſe the ſmall veſſels bleed plentifully, you may throw a handful of flour among the lint, which will contribute to the more effectual ſtopping up the orifices: before you lay on the pledget, you muſt bind the ſtump, and begin to roll from the lower part of the thigh down to the extremity of the ſtump. The uſe of the roller is to keep the ſkin forwards, which, notwithſtanding the ſteps already taken to prevent its falling back, would, in ſome meaſure, do ſo, unleſs ſuſtained in this manner. The dreſſing may be ſecured by the croſs cloth and gentle bandage; and the method of treating the wound may be learnt from what has been ſaid with reſpect to recent inciſed wounds.

Before the invention of making the double inciſion I have juſt now deſcribed, the cure of a ſtump was always a work of length of time, for by cutting down to the bone at once, and ſawing it directly, the conſequence was, that the ſkin and fleſh withdrew themſelves, and left it protruding out of the wound two or three inches in ſome caſes; ſo that it rarely happened that an exfoliation did not follow, which beſides being tedious, alſo frequently reduced the wound to

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an habitual ulcer, and at beſt, left a pointed ſtump, with a cicatrix ready to fly open upon the leaſt accident; all which inconveniencies are avoided by this new method; and I know not of any objection to it, unleſs that the pain of making the wound, is ſuppoſed to be twice as much as in the other, becauſe of the double inciſion; but when we conſider that we only cut the ſkin once, and the fleſh once, though not in the ſame moment, I fancy upon reflection, the difference of pain will be thought inconſiderable.

It muſt be confeſſed, however, that notwithſtanding we derive ſuch benefits from the double inciſion, the contractile diſpoſition of the muſcles, and perhaps of the ſkin itſelf, is ſo great, that in ſpite of any bandage, they will retire from the bone, eſpecially in the thigh, and ſometimes render the cure tedious.

To remove this difficulty, I have lately in amputations of the thigh, made uſe of the croſs-ſtitch, which I would adviſe to be applied in the following manner:

Take a ſeton needle, and thread it with about eight threads of coarſe ſilk, ſo that when they are doubled, the ligature will conſiſt of ſixteen threads, about twelve or fourteen inches long; wax it pretty much, and range the threads ſo that the ligature may be flat, reſembling a piece of tape, after which, oil both it and the needle: the flatneſs of the ligature will prevent its wearing through the ſkin ſo faſt as it would do if it was round, and the oil will facilitate its paſſage: then carry the needle through the ſkin, at about an inch from the edge of the ſtump, and out again on the inſide of the ſtump; after which it muſt be paſſed through the oppoſite ſide of the ſtump, from within outward, exactly at the ſame diſtance from the lips of the wound; this done, the ſilk is to be tied in a bow-knot. With another needle and ſkain of ſilk, the ſame proceſs is to be repeated, in ſuch manner that the ligatures may cut each other at right angles. If it is a large thigh, the lips of the wound may be made to approach each other ſo nearly, as that the diameter of the wound may be about two inches long; but in this, and in all other ſtumps, the approximation of the lips will depend upon the laxneſs of the ſkin, and the quantity preſerved by an artful double inciſion; for the ſkin muſt not be drawn together ſo tight as to put it upon the ſtretch, leſt it ſhould bring on an inflammation and pain.

The manner of applying the croſs-ſtitch, after the amputation of a leg, has nothing particular in it, only that the threads muſt be carried between the tibia and fibula, rather than directly over the tibia: and before the ſkin is drawn over the end of the ſtump, it will be proper to lay a thick doſſil of lint on the edges of the tibia, in order to prevent them from wounding the ſkin. The dreſſings muſt be ſuperficial; and to preſerve the wound clean, an injection of barley water, or warm milk, may be thrown in, with a ſmall ſyringe, between the ſtitches, which will prevent any matter from harbouring there.

I have adviſed the ſkains of ſilk to be tied in a bow-knot, that in caſe of an hæmorrhage, they might be undone, in order to diſcover the veſſels more eaſily, and alſo, if any tenſion ſhould enſue, that they might be looſened for three or four days, and then tied again when the ſuppuration comes on, and the parts are more at liberty.

Perhaps it may be objected that the double inciſion is of itſelf ſufficient for anſwering the ends propoſed by this meaſure; but whoever is converſant in this branch of practice, muſt know, that notwithſtanding the lax ſtate of the ſkin and muſcles at the time of the operation, yet ſome days after they fall conſiderably back from the bone, and in the thigh particularly, ſo much that no bandage will ſuſtain them; the conſequence of which

which is, a proportionable largeneſs of wound, a tedioufneſs of cure, and ſome degree of pointedneſs in the ſtump. It may be obſerved too, that the ſtrictneſs of bandage employed for ſupporting the ſkin and muſcles of the thigh, is not only painful, but in all probability may obſtruct the cure of the wound by intercepting the nutrition; for it is certain, that by long continuance it often waſtes the ſtump, and I am jealous it may alſo be acceſſary to thoſe abſceſſes, which ſometimes form amongſt the muſcles in different parts of the thigh.

The queſtion then remaining is, whether theſe ſtitches will ſupport the ſkin and muſcles more effectually than bandage, without producing ſome new evil, a point which can only be decided by experiment. It is true that this very method was followed by ſome of our anceſtors, and the objections to it have abſolutely prevailed over the arguments in favour of it; for few people now even know it ever was practiſed. Yet I cannot help imagining that caprice may have had more ſhare in utterly diſcarding this method, than reaſon and obſervation; for it is poſitively ſaid, by ſome of the moſt able and candid practitioners, to have ſucceeded marvelouſly; and as the inflammation and ſymptomatic fever ſuppoſed to be excited by it, were always relievable by cutting or looſening the ſtitches, there does not ſeem to have been reaſonable grounds for wholly giving up ſuch great advantages.

But if the objections to it were of force, when the ſingle inciſion was practiſed, they diminiſh exceedingly now that we perform the operation by the double inciſion; for though the double inciſion does not wholly prevent the withdrawing of the muſcles from the bone, yet it abates the degree of it ſo much, that they can ſuffer the ſtitches, without incurring either inflammation or pain, to which they were much more liable after the ſingle inciſion. It muſt be remarked however, that they draw with that ſtrength as to make the ſtitches wear the ſkin and fleſh in twelve or fourteen days but this is done ſo gradually, that it cauſes very little pain or inflammation, and though they conſequently come off with the dreſſings, yet by this time the ſkin and muſcles are fixed; and a ſlight bandage will be ſufficient to maintain them in the ſame poſition.

The two greateſt objections I know of, to this method, are, the deformity of the ſtumps, and the additional pain of the operation; but as a ſtump is not expoſed to view, after the cure, its want of beauty is of no great conſequence; and though it muſt be granted that the ſtitches cannot be made without ſome pain, perhaps it will not be found ſo bad as one is apt at firſt to ſuggeſt; for the mere paſſing of a large needle through the fleſh without making a ſtricture, is very bearable in compariſon of a tight ligature: but whatever be the increaſe of pain for the preſent, the future eaſe in conſequence of it is an ample compenſation; and, if I am not miſtaken, there is ſtill another conſideration of a much higher importance than any I have mentioned, I mean a leſs hazard of life.

For the ſymptomatic fever, and the great danger of life attendant upon an amputation, do not ſeem to proceed purely from the violence done to nature by the pain of the operation, and the removal of the limb; but alſo from the difficulties with which large ſuppurations are produced; and this is evident from what we ſee in very large wounds that are ſo circumſtanced as to admit of healing by inoſculation, or as ſurgeons expreſs it, by the firſt intention; for, in this caſe, we perceive the cure to be effected without any great commotion, whereas the ſame wound, had it been left to ſuppurate, would have occaſioned a ſymptomatic fever, &c. but in both inſtances, the violence done by the mere operation is the ſame, whether the wound be ſewed up or left to digeſt.

Upon

Upon this principle, we may account for the diminution of danger, by following the method here propoſed; becauſe as the ſtitches have a power of holding up the fleſh and ſkin over the extremity of the ſtump, till they adhere to each other in that ſituation, they actually do by this means leſſen the ſurface of the wound; in conſequence of that, the ſuppuration; and in conſequence of both, the danger reſulting from the ſuppuration.

In amputating the thigh, the firſt incifion is to be made a little more than two inches above the middle of the patella; after the operation, a roller ſhould be carried round the body, and down the thigh, to ſupport the ſkin and fleſh; this is alſo the moſt proper bandage, as abſceſſes will ſometimes form in the upper part of the thigh, which cannot diſcharge themſelves ſo conveniently with any other, it being almoſt impracticable to roll above the abſceſs unleſs we begin from the body.

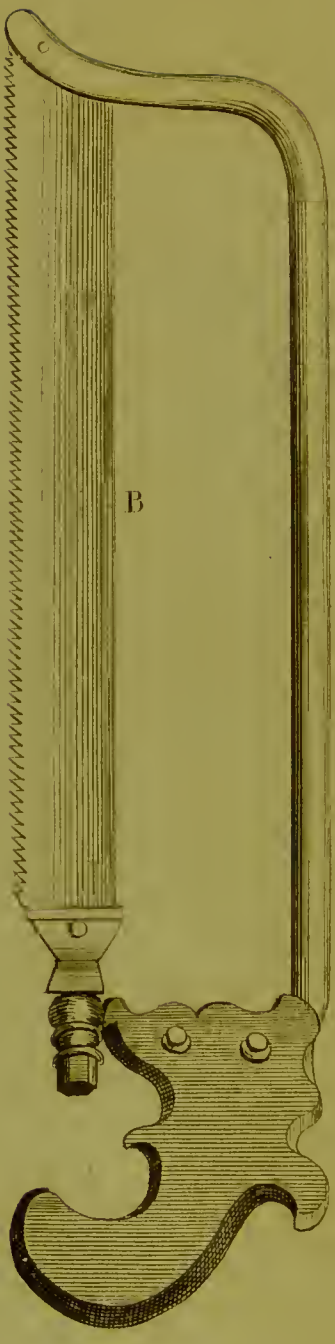
The amputation of the arm or cubit differs ſo little from the foregoing operations, that it will be but a repetition to deſcribe it. However, it muſt be laid down as a rule, to preſerve as much of the limb as poſſible, and in all amputations of the upper limbs, to place your patient in a chair.

There are in the armies a great many inſtances of gun-ſhot wounds of the arm near the ſcapula, which require amputation at the ſhoulder; but the apprehenſion of looſing their patients on the ſpot by the hæmorrhage has deterred ſurgeons from undertaking it. I have known where it has been done more than once with ſucceſs; but though it had never been performed, we might learn it is practicable, from the caſe of a poor miller, whoſe arm and ſcapula were both toren from his body, by a rope which was accidentally twiſted round his wriſt, and ſuddenly drawn up by the mill. Almoſt every one in London knows the ſtory, and that he recovered in a a few weeks. It is very remarkable in this accident, that after fainting, the hæmorrhage ſtopped of itſelf, and never bled afreſh, though nothing but lint and turpentine were laid on the great veſſels. In caſe, therefore, of a wound or fracture near the joint, or incurable fiſtulas in the joint, not attended with much caries, I think the operation may be performed ſafely in this manner.

The patient being laid on his back, with his ſhoulder over the edge of the table, make an inciſion through the membrana adipoſa, from the ſhoulder acroſs the pectoral muſcle, down to the arm-pit; and in order to ſave as much ſkin as poſſible, begin it about two inches below the joint; then turning the knife with its edge upwards, divide that muſcle, and part of the deltoid, all which may be done without danger of wounding the great veſſels, which will become expoſed by theſe openings: if they be not, cut ſtill more of the deltoid muſcle, and carry the arm backward: then with a ſtrong ligature, having tied the artery and the vein, carefully divide thoſe veſſels at a conſiderable diſtance below the ligature, and purſue the circular inciſion through the joint, cutting firſt into that part of the burſal ligament which is the neareſt to the axilla: for if you attempt to make way into the joint, on the upper part of the ſhoulder, the projection of the proceſſus acromion, and proceſſus coracoides, will very much embarraſs if not baffle the operation. After the amputation, the croſs-ſtitch may be practiſed here with great benefit.

The amputation of the fingers and toes is better performed in their articulation, than by any of the other methods; for this purpoſe a great knife muſt be uſed, and the inciſion of the ſkin be made not exactly upon the joint, but a little towards the extremity of the fingers, that more of it may be preſerved for the eaſier healing afterwards; it will alſo facilitate the ſeparation in the joint, when you

A


B

you cut the finger from the metacarpal bone, to make two small longitudinal incisions on each side of it first. In these amputations, there is generally a vessel or two that require tying, and which often prove troublesome when the ligature is omitted.

It may happen that the bones of the toes, and part only of the metatarsal bones are carious, in which case the leg need not be cut off, but only so much of the foot as is disordered; a small spring-saw is better to divide with here, than a large one: when this operation is performed, the heel and remainder of the foot will be of great service, and the wound heal up safely, as I have found by experience.

PLATE XIV.

THE EXPLANATION.

A. The figure of the amputating knife. The length of the blade and handle should be about thirteen inches.

B. The figure of the saw used in amputating the limbs. The length of the handle and saw should be about seventeen inches.

CHAP. XXXVIII.

OF INOCULATION.

IT is usual to prepare the patient for this operation by diet and evacuations, which, according to the habit of body, are to be more or less severe. Some physicians recommend frequent bleedings and purgings, with a strict milk diet, the preceding two months; others a regimen of mercurial alteratives, with gentle purges at proper intervals, for the same length of time; but I think those of the greatest eminence in London, seldom prescribe bleeding more than once, and frequently not at all, trusting to an abstemious course of life, and two or three gentle purges, and sometime to one only, the week before the operation, at least where the subject is young.

The proper time for inoculation is generally supposed to be infancy; and some think the earlier the better; but as children the first two or three years of their life, are subject to many terrible disorders from the circumstance of breeding their teeth, and indeed seem more liable to fatal convulsions upon the eruption of the small-pox, than after that time, I believe it is advisable to postpone the operation till they are three or four years old, when probably, the longer it is deferred, so much the worse; though the success of this practice has been surprising, even in the most advanced age.

Physicians have not unanimously determined which is the preferable part for inoculation, the arms or legs; and some order the operation to be performed in one of each: in either case, it is right to do it in two places, though probably it will not be absolutely necessary; but as one of the applications may by accident fall off, or slip on one side from the orifice, the other will generally take effect, and prevent a disappointment. The practice of inoculating in the legs, is preferred to the other method by some, from an observation that the incisions in these parts are more disposed to ulcerate than those in the arms, which circumstance they imagine to be advantageous, upon a persuasion it makes a powerful revolution of the morbid matter from the face and throat: on the contrary, the advocates for inoculating in the arms, advise it for the very reason that the orifices are less liable to become sore and painful; alledging, that the discharge from the wounds cannot be favourable to the eruption, since it seldom happens till the pustules appear, and are even ripe; or should it be judged necessary from the nature of the distemper, or the patient's constitution, to continue the discharge, still it may be done as efficaciously in

the arms, by converting one or both incisions into an issue. These considerations have induced the generality of physicians to approve of this last method.

The operation is to be performed after this manner: you must, with a stocking needle, prick five or six large pustules on the arm or leg of the subject you inoculate from, when they are plumpest, and the distemper is at its height; then taking a few threads of lint, roll them up so as to make one thread of the thickness of fine worsted: draw this over the orifices made into the pustules, till a sufficient quantity of it is moistened by the matter issuing out of them. Cut this thread into pieces of the length of a barley-corn, and put them immediately into a little box or bottle, which should be shut up close; and though perhaps the matter may retain its efficacy for many hours or days, yet it is advisable to use it as soon as possible. It would be of no importance what part of the arms or legs were to receive the infection, but that a drain may be desirable after the illness; and therefore the incisions should be in those places where issues are generally ordered, that by putting in a pea, you may at pleasure procure a discharge from them as long as you shall think proper, a month, two months, or more: the orifices should be cut with a lancet the length of a barley-corn, and so shallow, as barely to fetch blood; the pieces of lint must be laid exactly on them, and secured in their situation by a sticking-plaster and bandage; this application should remain twenty-four or thirty-six hours, and afterwards the orifices may be treated every day with digestives, or other medicines, according to their degree of inflammation, ulceration, and pain. After the operation, the patient must be confined, and live low till the time of the eruption, which is usually about the eighth or ninth day, when the distemper is to be managed as in the ordinary method.

It is imagined by some, that the matter from an inoculated subject, is less malignant than from a person who has the distemper, however mildly, in a natural way; but I think there is not a sufficient foundation for this opinion: it is without doubt proper to take it from a kind sort of a healthy subject; and though it is not probable any other constitutional illness will be communicated with the small-pox by inoculation, rather than by the natural way, which nobody even suggests; yet, as we may have choice of patients to borrow it from, we should not run any risk, but fix on such, if possible, who are under nine or ten years of age, and whose parents have always been healthy as well as themselves.

It may not be amiss to observe, that upon the introduction of the practice of inoculation into England, among the many popular prejudices which prevailed against it, there was none of such seeming weight, as the opinion that it did not absolutely secure the patient from contracting the distemper again in the natural way; but length of years, and a strict enquiry, have at last entirely falsified this doctrine, among men of learning and candour. Great improvements have been made in England since the publication of the foregoing chapter, both in the method of inoculating, and the manner of treating the distemper; but as they are described with great precision by Baron Dimsdale, I shall refer the reader to his pamphlet on this subject.

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